NEET BIOLOGY

PLANT KINGDOM

1.	In pteridophytes, gametophytes requireA to grow			
	a) Cool, dallip and shady places	d) Water		
2	Which one of the following pairs of plants are not s	u) Water		
۷.	a) Form and <i>Eumaria</i>	b) Europrig and Eigur		
	a) Figure and Chlamydomonas	d) Forn and <i>Dinus</i>		
2	A bryophyte which harbourg a nitrogon fiving blue	groon alga in its thallus is		
5.	a) Pogonatum b) Piccia	c) Marchantia	d) Inthocoros	
А	Rhodonhytes are commonly called as	cj marchantia	uj Anthoteros	
1.	a) Blue-green algae b) Red algae	c) Brown algae	d) Green algae	
5	This place in India is called 'The Golden Mine of Liv	erworts'	uj ul cen algae	
0.	a) Eastern Himalayas b) Western Himalayas	c) Western Ghats	d) Eastern Ghats	
6	In the alternation of generations the sporophytic ge	enerations is A and the s	ametophytic generation is	
0.	B Here A and B refer to		sumetophy de generation is	
	a) $A-2n$; $B-n$ b) $A-n$; $B-2n$	c) A- <i>n</i> : B- <i>n</i>	d) A-2 <i>n</i> : B-2 <i>n</i>	
7.	Chloroplasts of <i>Spirogyra</i> have	,		
	a) Spiral margin	b) Smooth of waxy marg	in	
	c) Smooth margin	d) None of these		
8.	In Selaginella the adaxial outgrowth from the base	e of leaf is called		
	a) Ligule b) Velum	c) Rhizophore	d) Glossopodium	
9.	In Dryopteris, the opening mechanism of sporangi	um is effectively operated h	у	
	a) Stalk b) Stomium	c) Annulus	d) None of these	
10.	Calcium encrustation and larvicidal properties are	present in		
	a) Chara b) Oscillatoria	c) Diatoms	d) Canlerapa	
11.	Iodine is obtained from			
	a) Laminaria b) Chlorella	c) Polysiphonia	d) Porphyra	
12.	Number of archegonia in <i>Cycas</i> is			
	a) 8 b) 4	c) 1	d) 2	
13.	Which of the following in moss capsule is haploid/g	gametophytic tissue?		
	a) Annulus and peristome	b) Calyptra and spore		
	c) Columella and theca	d) Operculum foot and se	eta	
14.	In angiosperms seeds are enclosed by			
	a) Flowers b) Fruits	c) Ovule	d) Parianth	
15.	Double fertilisation involves			
	a) Syngamy and triple fusion	b) Double fertilisation		
	c) Development of antipodal cell	d) Development of syner	gids	
16.	Which one of the following is a gymnosperm?			
	a) Mango b) Walnut	c) Funaria	d) Chilgoza	
17.	Which of the following propagates through leaf-tip			
10	a) Walking tern b) Sprout-leaf plant	c) Marchantia	a) Moss	
18.	The spores in the moss plant are formed in			

	a) Foot b) Seta	c) Capsule	d) Both (b) and (c)
19.	Antherozoids of Dryopteris are		
	a) Multiciliated and coiled	b) Multiciliated and sickle	e-shaped
	c) Biciliated and coiled	d) Biciliated and sickle-sl	naped
20.	Which has vascular tissue, produces spores but does	not have seeds?	
	a) Bryophyta b) Pteridophyta	c) Gymnosperms	d) Angiosperms
21.	Which of the following correctly represents the type	of life cycle patterns from	the options given?
	Zygote Gametogenesis Gametophyte (n) Gametophyte (n) Gametophyte (n) Sporophyte Zygote (2n) Sporophyte Zygote (2n) Sporophyte (2n) Sporophyte (2n) Sporophyte (2n) Sporophyte (2n) Sporophyte (2n) Sporophyte (2n) Meiosis Sporophyte (2n) Meiosis Sporophyte (2n) Meiosis Sporophyte (2n) Meiosis		
	Gametophyte		
	a) A-Haplontic, B-Diplontic, C-Haplo-diplontic	b) A-Diplontic, B-Haplon	tic, C-Haplo-diplontic
	c) A-Haplo-diplontic, B-Diplontic, C-Haplontic	d) A-Diplontic, B-Haplo-d	liplontic, C-Haplontic
22.	Consider the following statements about bryophyte	plants	
	I. The tea prepared from <i>polytrichum commune</i> is u	used to dissolve kidney and	l gall bladder stones
	II. Many chemical products such as alcohol, ammonia	um sulphate, paraffin, brov	vn dye, etc., can be obtained
	from peat		
	Choose the correct option		
	a) I is true, II is false	b) II is true, I is false	
	c) Both I and II are true	d) Both I and II are false	
23.	Moss capsule represents a		
	a) Gametophyte b) Sporophyte	c) Part of protonema	d) Part of sorus
24.	The gametophyte is not an independent, free living g	generation in	
05	a) Adiantum b) Marchantia	c) Pinus	d) Polytrichum
25.	Which one is not the feature of <i>Cycas</i> ?		
	a) Unbranched stem		
	b) Pinnate leaves (a) The male or female concerned with bottom on the di	fforont troo	
	c) The male of female cones may be borne on the di	lierent tree	
26	The members of brown algae (class-Dhaeonbyceae)	have gelatinous coating ou	utside the collulosic coll wall
20.	called	nave gelatillous coatilig of	itsitte the, centrosic cen wan
	a) Algin b) Glycoalgin starch	c) Polyalginate	d) Polyolefin
27.	In Bryophtya, the adult plant body is		
	a) Sporophyte b) Epiphyte	c) Sporophyll	d) Gametophyte
28.	Difference between algae and bryophytes is		
	a) Terrestrial habitat b) Sterile jacket	c) Biflagellate gametes	d) None of the above
29.	The correct names of gymnospermic plant A, B and C	C shown in figure below ar	re .
	a) A- <i>Cycas</i> , B- <i>Ginkgo</i> , C- <i>Pinus</i>	b) A- <i>Cycas</i> , B- <i>Pinus</i> , C- <i>Gi</i>	nkgo

	c) A- <i>Ginkgo</i> , B- <i>Cycas</i> , C- <i>Pinus</i>	d) A- <i>Pinus</i> , B- <i>Cycas</i> , C- <i>Ginkgo</i>
30.	Which one of the following is an exampl	f chlorophyllous thallophyte?
	a) Volvariella b) Spirogyrd	c) Nephrolepis d) Gnetum
31.	Which of the following is known as pone	lk?
	a) <i>Spirogyra</i> b) <i>Ulothrix</i>	c) Nostoc d) Anabaena
32.	Which of the following does not belong	:lass-Phaeophyceae (brown algae)?
	a) <i>Ectocarpus</i> and <i>Dictyota</i>	b) <i>Laminaria</i> and <i>Sargassum</i>
	c) <i>Fucus</i> and <i>Dictyota</i>	d) <i>Polysiphonia</i> and <i>Gelidium</i>
33.	In pteridophyte, the sporophytes consis	i leaf-like appendages called
	a) Megaphylls b) Sporophyl	c) Thalli d) Sporangia
34.	Melosis in Spirogyra, Ulothrix, Uniamy	monas and most of the algae/thallophytes is
25	a) Sporic b) Zygotic	c) Gametic d) Unequal
35.	In Funaria, stomata are present on the	a) Canaula d) Anonhusia
26	a) Stelli D) Leaves	c) capsule d) Apophysis
50.	a) Multiflagollate sporms	b) Nackad saada
	a) Wingod soods	d) Soods inside fruits
37	Which of the statement is correct about	urchantia?
57.	I Plant hody is thallus-like structures cl	ly attached to substrate
	II. Snoronhyte is differentiated into food	eta and cansule
	III. Gemma cup located on the thalli	
	a) I and II b) I and III	c) II and III d) I. II and III
38.	Heterocysts are found in	
00.	a) Cvanophyceae b) Chlorophy	ae c) Phaeophyceae d) Rhodophyceae
39.	Mosses occur in moist place because	
	a) The cannot grow on land	b) Their gamete fuses in water
	c) They lack vascular tissue	d) They lack root and stomata
40.	Angiospermic plants are characterised b	
	I. double fertilisation	
	II. triploid endosperm	
	III. Diploid endosperm	
	Choose the correct option from the follo	ng regarding above statements
	a) I and II are correct	b) I and III are correct
	c) II and III are correct	d) I, II and III are correct
41.	Read carefully the following statement a	ut the sexual reproduction in ferns
	I. Water is essential for fertilisation	
	II. Male gametophyte bears antheridia, v	le female gametophyte bears archegonium, which produces
	antherozoids and egg cell, respectively	
	III. Antherozoids and egg cell fuses to gi	rise zygote. Zygote develops into young embryo. Embryo giv
	rise to sporophyte	
	Which of the statements given above are)rrect?
40	a) I and II b) II and III	C) I and III d) I, II and III
42.	which of the following part of <i>Fundria</i>	a) Deviatorea di Appulua
12	In A gamatanhutic phase is dominan	c) relisione uj Annuus
45.	Identify the A and B choose the correct	tion
	a) A-nteridonhytes: R-algae	h) A-hrvonhutes, R-nteridnhutes
	c) A-gymnosnerm, R-fungi	d) A-angisnerms, B-algae
44	In which of the following group would y	nlace a nlant, which produce seeds but lacks fruits?
	a) Fungi	h) Pteridonhytes
		oj i teritopitytes

	c) Bryophytes		d) Gymnosperms		
45.	5. The bryophytes are fundamentally terrestrial plants but require presence of water to complete their life			ater to complete their life	
	cycle. The water is needed for				
	I. dehiscence of antheridia				
	II. liberation of antherozo	oids			
	III. transfer of sperms fro	m antheridia to archegonia	1		
	IV. opening of archegonia	ll neck			
	V. the movement of anthe	erozoids into the archegoni	al neck		
	Which of the statements	given above are correct?			
	a) I, II and IV	b) II, III, IV and V	c) III, IV and V	d) I, II, III, IV and V	
46.	In gymnosperms, the nuc	ellus is protected by envelo	ops and this composite stru	icture is known as	
	a) Ovule	b) Ovary	c) Anther	d) Strobili	
47.	Pinus belong to the class				
40	a) Gnetopsida	b) Cycadopsida	c) Coniferopsida	d) Sphenopsida	
48.	In comparition to anglos	perm, which one of the follo	owing algae exhibits haplo-	diplontic life cycle	
40	a) <i>Volvox</i>	b) <i>Chlamydomonas</i>	c) <i>Ectocarpus</i>	a) <i>Fucus</i>	
49.	Storage boales, pyrenola	s in the chloroplast contain	b) Carrie alerates and areas	h - !	
	a) Protein and starch	otoin	d) Starsh and linid	tein	
FO	The red colour of 'red cor	olelli o' is due to which of the foll	u) Startin and hpiu		
50.	a) Chlamydomonas	h) Anahaona	c) Microcustis	d) Trichodosmium	
51	In Eunaria the number of	of peristomial teeth is	cj microcystis	uj minouesmium	
51.		h) 10	c) 16	d) 32	
52	The members of Phaeon	by 10 by ceae are commonly called	1	u) 52	
52.	a) Green-algae	h) Blue algae	c) Brown algae	d) Golden algae	
53.	Two adjacent filaments o	f Spiroavra af finis each	10 cells participating in rep	roduction. How many new	
	<i>Spirogyra</i> plants are pro	duced during sexual repro	duction?	jj	
	a) 5	b) 10	c) 20	d) 40	
54.	Which group of plant con	stitute the lower bryophyte	es?	,	
	a) Liverworts	b) Mosses	c) Anthocerotales	d) Jungermanniales	
55.	Algal zone is present in				
	a) Normal root of Cycas		b) Coralloid root of Cyca.	S	
	c) Normal root of <i>Pinus</i>		d) Stem of Cycas		
56.	Isogamy is found in				
	a) <i>Spirogyra</i>	b) <i>Chlamydomonas</i>	c) Both (a) and (b)	d) <i>Fucus</i>	
57.	Cleavage polyembryony	occurs in			
	a) Pinus	b) Mini Cycas	c) Cycas	d) Ephedra	
58.	Zygote of <i>Spirogyra</i> pro	duces four haploid nuclei ir	n which		
	a) One is functional	b) Two are functional	c) Three are functional	d) All are functional	
59.	The members of brown a	lgae are found primarily in			
	a) Freshwater habitat		b) Marine habitat		
(0)	c) Terrestrial habitat	·· · · · · · · · · · ·	d) On moist rock		
60.	A prokaryotic autotrophi	c nitrogen fixing symbiont	is found in		
(1	a) <i>Lycas</i>	D) ClCer	C) PISUM	a) Ainus	
61.	sporophytic generation is	s dominant phase in the life	e cycle of	d) Liver verte	
62	a) <i>Marchentia</i>	DJ Ferns	c) Mosses	a) Liverworts	
02.	a) Sevual reproduction a	cours by the fusion of anthe	aridia and archagonia whic	h are produced at the apoy	
	of the leafy shoots	ccurs by the fusion of diffie	li ula allu al cliegollia, Wille	in are produced at the apex	
	h) Sporonhyte is differen	tiated into food seta and ca	ansule		
	s, sporophyte is unrefen		~~~~		

	c) Seta and capsule bears spores, which give rise to gametophyte after meiosis				
()	d) The sporophyte in mos	sses is more elaborate than	that in liverworts		
63.	Gemmae are asexual bud	s, which originate from sma	all receptacles called gemm	a cups.	
	a) <i>Euroria</i>	h) Marchantia	c) Form	d) Sphagnum	
64	a) <i>Funeria</i> Tallest flowering tree is			u) <i>Spilagilulli</i>	
01.	a) <i>Pinus</i>	h) <i>Cedrus</i>	c) <i>Sequoia</i>	d) <i>Eucalyntus</i>	
65.	Oogamous means	5) 000105	ej bequoiu	aj Eucuryptus	
	a) Fusion between female	e and male gametes. Both a	re similar in size		
	b) Fusion between one la	rge female gamete and a sn	naller non-motile male gam	iete	
	c) Fusion between one la	rge female gamete and a sn	naller motile male gamete		
	d) Fusion between one sr	naller female gamete and a	large motile male gamete		
66.	Which is wrong in respec	t to bryophytes?			
	a) Water is essential for s	exual reproduction			
	b) Presence of antheridiu	m			
	c) Presence of ciliated sp	erms			
(7	d) Presence of autotrophi	ic independent sporophyte			
67.	a) Preprior Is a	h) Dtaridanhuta	a) Cumposporm	d) Angiognarm	
68	'Club moss' belongs to	b) Fteridopilyte	c) Gymnosperm	uj Aligiosper lli	
00.	a) Algae	h) Pteridonhyta	c) Fungi	d) Bryonhyte	
69.	Isogamous mean	b) i toridopilyta	oj i uligi	aj bijopnyte	
	I. both gametes are simila	ar in size and non-motile,			
	II. both gametes are dissi	milar in size and motile			
	III. both gametes are simi	lar in size and motile			
	IV. both gametes are diss	imilar in size and non-moti	le		
	Which of the statement(s) given above is/are correc	t?		
	a) I and II	b) I and III	c) II and IV	d) Only IV	
70.	Characters of both conife	rs and cycads are found in			
71	a) GINKGO	b) Epheara	c) Lupressus	d) I suga	
/1.	a) Multicellular non-moti		h) Bryonhytes with simpl	e internal organization	
	c) Unicellular motile alga	e	d) Pteridophytes with cor	nplex internal organization	
72.	Female sex organ in a flow	wer is		inpresi inter nar organization	
	a) Carpel or pistil		b) Carpel or androecium		
	c) Shot		d) Stamen		
73.	Which economically impo	ortant product is obtained f	rom Cycas circinalis?		
	a) Timber	b) Sago	c) Essential oil	d) Resin	
74.	Artificial system of classif	fication was given byA	and based onB		
	Fill the blanks with respect to A and B. choose the correct option				
	a) A-Aristotle; B-anatomi	cal characters			
	b) A-Linnaeus; B-cytologi	cal information			
	d) A-Haeckel: B-morphol	ogical characters			
75	Sea weeds are important	source of			
<i>,</i> J.	a) Chlorine	b) Fluorine	c) Iodine	d) Bromine	
76.	Terms artificial, natural a	nd phylogenetic are relate	d to types of	-, -,	
-	a) Cytotaxonomy	1,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0	b) Classification of plants		
	c) Classification of anima	ls	d) Both (b) and (c)		
77.	Holdfast, stipe and frond	constitutes the plant body	in case of		

	a) <i>Volvox</i>	b) <i>Chara</i>	c) <i>Laminaria</i>	d) <i>Chlamydomonas</i>
78.	In Chlorophyceae, the mo	ode of sexual reproduction	is	
	a) Anisogamy	b) Oogamy	c) Isogamy	d) All of these
79.	The positive evidence of	aquatic ancestory of bryop	hytes is indicated by	
	a) Ciliated sperms	b) Gametophytic body	c) Biflagellate gametes	d) Peristomial teeth
80.	In gymnosperm the roots	are generally		
	a) Respiratory root	b) Prop root	c) Tap root	d) Adventitious root
81.	Which type of chloroplas	ts are present in the memb	ers of class-Chlorophyceae	?
	a) Discoid and plate-like		b) Reticulate and cup-sha	nped
	c) Spiral or ribbon-shape	ed	d) All of the above	
82.	Seed habit is linked to			
	a) Homospory	b) Heterospory	c) Parthenogenesis	d) Parthenocarpy
83.	Algae occur in/on			
	a) Fresh and marine wate	er	b) Moist stones	
	c) Moist soils and wood		d) All of these	
84.	Which of the following pl	ant group is considered as	first terrestrial plants to po	ossess vascular tissues
	xylem and phloem?			
	a) Bryophytes	b) Pteridophytes	c) Gymnosperm	d) Angiosperm
85.	At the base of seta of capa	sule of moss, there is a hap	loid brownish growth calle	d
	a) Calyptra	b) Perigonium	c) Vaginula	d) Perichaetial
86.	Sphaerocarpus belongs	to		
	a) Bryophyte	b) Pteridophyta	c) Gymnosperms	d) Angiosperms
87.	Egg apparatus of angiosp	erms consist of		
	a) One synergid and two	egg cells	b) Two synergids and on	e egg cell
	c) One central cell, two p	olar nuclei and three	d) One egg cell, two polar	nuclei and three antipodal
	antipodal cells		cells	
88.	Meiosis in <i>Dryopteris</i> ta	kes place during		
	a) Gamete formation	b) Spore germination	c) Zygote formation	d) Spore formation
89.	Which of the following pl	ants produces seeds but no	ot flowers?	
	a) Maize	b) Mint	c) Peepal	d) Pinus
90.	Identify the wrong stater	nents	5 1	,
	a) The ovule develops int	to seed	b) The ovary develops int	to fruit
	c) The triple nucleus dev	elops into endosperm	d) Double fertilisation is	the fusion of male gamete
	y	1 1	with egg	0
91.	Select one of the followin	g pairs of important featur	es distinguishing <i>Gnetum</i> f	rom Cycas and Pinus and
	showing affinities with a	ngiosperms	0 0	, ,
	a) Absence of resin duct	and leaf venation		
	b) Presence of vessel eler	nents and absence of arche	egonia	
	c) Perianth and two integ	zuments	0	
	d) Embryo development	and apical meristem		
92.	From which of the follow	ing plants is a medicine for	respiratory disorders obta	uned?
	a) Ephedra	b) Eucalvptus	c) Cannabis	d) Saccharum
93.	In <i>Funaria</i> , antheridial b	ranch is called	,	,
	a) Male flower	b) Female head	c) Male cone	d) Female cone
94.	Which of the following is	not the feature of gymnosr	perms?	,
	a) Parallel venation		b) Perennial plants	
	c) Distinct branches (lon	g and short branches)	d) Xylem with vessels	
95.	The alga used in space re	search is	, ,	
2.5	a) <i>Cephaleuros</i>	b) <i>Gelidium</i>	c) <i>Chlorella</i>	d) <i>Gracilaria</i>
96.	The cones bearing megas	porophyll with ovules are	called	,
		1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		

a) Male strobili	b) Female strobili	c) Megasporangia	d) Microsporangia
97. In <i>Spirogyra</i> the sporo	phytic stage is dominant		
a) True		b) False	
c) Some times (a) and ((b)	d) Neither (a) nor (b)	
98. Ovules are borne on			
a) Microsporophyll	b) Megasporophyll	c) Macrosporophyll	d) Both (a) and (c)
99. Of the following groups	, which secrete and deposit	calcium carbonate and ap	opear like corals?
a) Green algae	b) Brown algae	c) Blue-green algae	d) All of these
100. In pteridophytes, phloe	m is without		
a) Sieve cells	b) Sieve tubes	c) Companion cells	d) Bast fibres
101. In algae the flagellate (r	notile) spore is called		
a) Aplanospore	b) Endospore	c) Zoospore	d) Akinetes
102. Ovules of gymnosperm	is		
a) Bitegmic	b) Unitegmic	c) Naked	d) Both (b) and (c)
103. In the given diagram, pa	arts labelled as, A, B, C, D, E	and F are respectively ide	entified as
60 B C F A E			
b) A-Polar nuclei, B- Eg c) A-Egg cell, B- Synerg d) A-Central cell, B-Pola 104. Agar, one of the comme a) To grow microbes	g cell, C-Antipodals, D-Cent ids, C- Central cells, D- Filifo ir nuclei, C- Filiform appara rcial products obtained fro	ral cells, E-Filiform appara orm apparatus, E- Antipod itus, E-Synergids, F-Egg ce m red algae is used b) In preparations of ic	itus, F- Synergids lals, F- Polar nuclei ll ce-creams and jellies
c) Both (a) and (b)		d) In sizing textiles and	l papers
105. Phycoerythrin is presen	nt in		
a) <i>Polysiphonia</i>	b) <i>Laminaria</i>	c) <i>Kelps</i>	d) <i>Chlamydomonas</i>
106. Protonema is formed in			
a) Moss	b) Liverworts	c) Ferns	d) <i>Cycas</i>
107. Consider the following	statements regarding the m	ajor pigments and stored	food in the different groups of
algae and select the cor	rect options given.		
I. In Chlorophyceae, the	stored food material is sta	rch and the major pigmen	ts are chlorophyll- a and d .
II. In Phaeophyceae, lan	ninarian is the stored food a	and major pigments are cr	liorophyll- <i>a</i> and <i>b</i> .
III. In Knodopnyceae, fi	oridean starch is the stored	food and major pigments	are chlorophylla- <i>a</i> , <i>a</i> and
phycoeryunrin.	III ana in connact	h) I and II and agree at 1	
a) I is correct, but if and	I III are incorrect	d) III is correct, but I are	out III is incorrect
c) I and in are correct,	out II is incorrect	d) III is correct, but I al	
108. Read carefully the given	i statements about algae an	ia choose the correct optic	JI
I. The plant body is that II. Mainly aquatic	IOIU		
III. Poproduction takes	nlaco hu vogotativo, acovua	land covual	
III. Reproduction takes	place by vegetative, asexual r are the colonial form of al	1 allu Staudi 1720	
a) []] and []]	h) II III and IV	c) I III and IV	VI hac III II (h
109 In angiosnerms the not	len grains and ovules are n	roduced in special structu	re called
a) Fruit	h) Seed	c) Flower	d) Lamina
	5,500	cj 1100001	

110 The members of Chloron by case are commonly calle	od.	
a) Red algae b) Brown algae	c) Green algae	d) Blue-green algae
111 Resin and turpentine are products of	c) dicentaigae	uj blue green algae
a) Teak b) Oak	c) Eucalyntus	d) Pine
112. In <i>Cycas</i> , pollination occurs at celled stage.	c) 2	w)
a) One b) Two	c) Three	d) Four
113. Moss peat s used as a packing material for sending f	lowers and live plants to d	istant places because
a) It is easily available	b) It is hygroscopic	L
c) It reduces transpiration	d) It serves as a disinfect	ant
114. In the angiosperm ovule, central cell of the embryo	sac prior to the triple fusio	n, contains
a) A single haploid nucleus	b) One diploid nucleus	
c) One haploid polar nuclei	d) One diploid and one h	aploid nuclei
115. The unique feature of bryophytes compared to othe	er green plant group is that	
a) They produce spores		
b) They lack vascular tissue		
c) They lack roots		
d) There sporophytes is attached to the gametophy	te	
116. <i>Cycas</i> leaflets are		
a) Sessile, straight, oval	b) Sessile, straight, linear	r-lanceolate
c) Sessile, straight, spiny	d) Sessile, smooth, twiste	ed
117. Which of the following are called vascular cryptoga	ms?	
a) Pteridophytes b) Bryophytes	c) Gymnosperms	d) Algae
118. In gymnosperms the dominate phase isA They	are heterosporous, produc	ceB andC Here, A, B
and C refers to		
a) A-sporophyte, B-haploid microspores, C-haploid	megaspores	
b) A-gametophyte, B-haploid microspores, C-diploid	d megaspores	
c) A-sporophyte, B-diploid microspores, C-diploid n	negaspores	
d) A-gametophyte, B-diploid microspores, C-haploid	d megaspores	
119. Algae are	h) Cimerla and thallaid	
a) Childrophyli bearing autotroph	d) Hotorotroph	
(J) Dotti (a) and (U)	uj neterotroph	
I They reproduce asevually by non-motile spores a	nd sexually by non-motile o	rametes
II In this class sexual reproduction is opgamous an	d accompanied by complex	nost-fertilisation
developments	a accompanied by complex	post for insution
III. The common members are <i>Polysiphonia</i> . Porph	uvra. Gracilaria and Gelid	ium
The above characteristics are belongs to which class	s of algae	
a) Chlorophyceae b) Phaeophyceae	c) Both (a) and (b)	d) Rhodophyceae
121. In gymnosperm dominant phase is		y 1 y
a) Sporophyte b) Gametophyte	c) Haploid	d) Diploid
122. In liverworts asexual reproduction takes place by		
a) Gemmae and fragmentation of thalli		
b) Fragmentation and zoospores		
c) Gemmae formation and spores formation		
d) Isogamy and anisogamy		
123. Which of the following is the amphibians of the plan	nt kingdom?	
a) Angiosperms b) Pteridophytes	c) Gymnosperm	d) Byrophytes
124. Identify the scientists worked extensively on chloro	phyllous and non-chloroph	nyllous thallophytes,
respectively.		
I. Iyenger II. Swaminathan		

III. Metha IV. Maheswari b) I and III c) II and III d) III and IV a) I and IV 125. Sago starch is obtained from a) Cedrus b) *Taxus* c) *Pinus* d) Cycas 126. In angiosperms endosperm is a) Haploid b) Diploid c) Triploid d) None of the above 127. Observe the diagrams given below and choose the correct option out of A of C, in which all the three items A, B and C are rightly identified a) A-Antheridiophore, B-Archegoniophore, C-Endospore

- b) A-Archegoniophore, B-Antheridiophore, C-Gemma cup
- c) A- Antheridiophore, B-Archegoniophore, C-Gemma cup
- d) A-Archegoniophore, B- Antheridiophore, C-Seta cup

128. Which of the following pteridophytes is heterosporous in nature?

- a) Selaginella and Salvinia
- c) *Psilotum* and *Lycopodium*
 - d) Adiantum and Psilotum
- 129. Which statement is incorrect about *Pinus*?
 - a) The male and female strobili may be produced on the same tree
 - b) The male or female strobili may be produced on different trees
 - c) Male and female sporophylls born on same strobilus
 - d) Male and female sporophylls born on different strobilus
- 130. Find out the mis-matched pair.
 - Agar Polymer of glucose
 - and sulphur containing a) carbohydrates
 - Chitin Polymer of b)
 - glucosamine
 - Peptidoglycan Polysaccharide linked
 - to peptides
 - Lipopolysaccharides A complex of lipid and

polysaccharide

- 131. Gymnosperms are naked seeded plants because
 - a) There is no fruit

b) There is no ovule

b) Adiantum and Equisetum

- c) There is no fertilization d) There is no ovary and fruit
- 132. Consider the following statements about green algae
 - I. Green algae are green due to the presence of chlorophyll-*a* and *b* pigments localised in chloroplast II. Algae store food in form of starch in a specialised structures called pyrenoids located in chloroplast. Food may be stored in form of oil droplets III. Vegetative reproduction occurs through cell division, fragmentation, stolons and tubers
 - Which of the statements given above are correct? a) I and II b) I and III c) II and III d) I, II and III
- 133. Stamen consists of a) Filament and anther b) Style and stigma c) Filament and pistil d) Anther and pistil 134. Cycads are
 - a) Homosporous and dioecious b) Homosporous and monoecious

c) Heterosporous and dioecious	d) Heterosporous and n	nonoecious			
135. 'Chilgoza' a gymnospermic seed that is eaten as dry fruit is produced by					
a) <i>Pinus roxburghii</i>	b) <i>Pinus geradiana</i>				
c) <i>Ginkgo biloba</i>	d) <i>Cedrus deodara</i>				
136. In <i>Funaria</i> capsule, dispersal of spores takes place	through				
a) Peristomial teeth b) Annulus	c) Calyptra	d) Operculum			
137. The plant body of all bryophytes are haploid and the	nallus like having				
a) True root, stem and leaves					
b) Root-like, leaf-like or steam like structure					
c) Vascular tissues (xylem and phloem)					
d) Complex tissues					
138. Though <i>Cycas</i> has two cotyledons, this is not inclu	ded in dicot because				
a) Of naked ovule	b) They have megaspor	e			
c) Appears as palm tree	d) Has compound leave	S			
139. Which one of the following is called maiden-hair fe	rn?				
a) Dryopteris b) Pteris	c) Adiantum	d) Lycopodium			
140. In gymnosperms, the pollen chamber represents					
a) A cell in the pollen grain in which the sperms ar	e formed				
b) A cavity in the ovule in which pollen grains are s	stored after pollination				
c) An opening in the megagametophyte through w	hich the pollen tube approx	aches the egg			
d) The microsporangium in which pollen grains de	velop				
141. Cyanobacterium is an algae having					
a) Blue-green pigment	b) Red pigment				
c) Brown pigment	d) Yellow-brown pigme	ent			
142. A mature pollen grain of <i>Pinus</i> has					
a) 2 cells b) 3 cells	c) 4 cells	d) 5 cells			
143. Mannitol is reserve food in					
a) Rhodophyceae b) Chlorophyceae	c) Phaeophyceae	d) Xanthophyceae			
144. In pteridophytes spore germinate to give rise to					
a) Thalloid gametophytes called prothallus	b) I halloid sporophytes	s called prothallus			
c) Thanold sporocarp	d) Thallold, photosynth	esis sporopnyte			
145. Gymnosperms include	a) Chrucha	d) All of these			
a) Medium-sized trees b) fail tree	cj sillubs	uj Ali ol tilese			
a) Vaccular	h) Monoscious				
a) Vasculai	d) Monoecious	n diagoigua			
147 Identify the plants shown in figure and select the s	uj May be monocious of	i uloecious			
	147. Identify the plants shown in figure and select the correct option				



a) A-*Marchantia* (male thallus), B-*Marchantia* (female thallus), C-*Funaria*, D-*Sphagnum* b) A-*Marchantia* (male thallus), B-*Marchantia* (female thallus), C- *Sphagnum*, D-*Funaria*

c) A- <i>Marchantia</i> (male thallus), B- <i>Marchantia</i> (female thallus), C-Polytrichum, D-Anthoceros			
d) A- <i>Marchantia</i> (female thallus), B- <i>Marchantia</i> (m	ale thallus), C- <i>Anthoceros</i> , I	D-Polytrichum	
148. Anther produces			
a) Pollen grains b) Spores	c) Gametes	d) Egg cell	
149. The only positive evidence of aquatic ancestry of bi	yophyte is		
a) Thread like protonema	b) Green colour		
c) Some forms are still aquatic	d) Ciliated sperms		
150. The heart-shaped form of prothallus represents			
a) Dioecious	b) Monoecious sporophy	te	
c) Monoecious gametophyte	d) None of the above		
151. Which of the following statements is right?			
a) Fronds are found in bryophytes	b) Multiciliate sperms ar	e found in angiosperms	
c) Diatoms produce basidiospores	d) Heterocysts are found	in Nostoc	
152. Classification on the basis of chemical constituents	of plant is known as		
a) Molecular taxonomy	b) Chemical taxonomy		
c) Chemotaxonomy	d) Chemosynthetic classi	fication	
153. Which of the following liverworts have thalloid plan	nt body?		
a) <i>Marchentia</i> b) <i>Funeria</i>	c) <i>Sphagnum</i>	d) <i>Pogonatum</i>	
154. Phycology is the study of			
a) Algae b) Fern	c) Fungi	d) Bryophytes	
155. Consider the following statements about bryophyte	es		
I. Sexual reproduction is oogamous type			
II. The sex organs are multicellular and jacketed wi	th sterile jacket		
III. The haploid gametophytes is dominant stage in	the life cycle bryophytes		
Which of the statements given above are correct?			
a) I and II b) I and III	c) II and III	d) I, II and III	
156. Chlorophyll- <i>b</i> is not present in	-	-	
a) Green algae b) Bryophytes	c) Spirogyra	d) Blue-green algae	
157. Natural system of classification were based upon	,,	, , ,	
a) Structural embryology	b) Phytochemistry		
c) Anatomy	d) All of the above		
158. Largest moss is	-		
a) <i>Pogonatum</i> b) <i>Funaria</i>	c) Dawsonia	d) Polytrichum	
159. Which of the following petridophytes belong to clas	ss-Pteropsida?		
a) <i>Equisetum</i> and <i>Psilotum</i>	1		
b) <i>Lycopodium</i> and <i>Adiantum</i>			
c) <i>Selaginella</i> and <i>Pteris</i>			
d) <i>Pteris</i> and <i>Adiantum</i>			
160. $Cycas revoluta is popularly known as$			
a) Date nalm b) Sago nalm	c) Sea palm	d) Roval nalm	
161 Pteridonhytes are also known as	ej beu pulli	uj noju pulli	
a) Cryptogams	h) Vascular crytogams		
c) Amphibious plants	d) Phanerogams		
162 Endosperm of symposperm is	a) i nanci oganio		
a) Dinloid b) Tetranloid	c) Hanloid	d) None of the above	
163 Have capacity of absorbing water used to replace c	otton and used as a fuel is	uj None of the above	
a) Marchantia b) Discia	c) Snhamum	d) Funaria	
164 Which of the following plant materials is an official	t water imbibant?	aj i unun tu	
a) Lignin h) Doctin	c) Agar	d) Cellulose	
a) Eignin U) FCUIII	of Agai	uj ul	
103. The first plants to appear after a forest fire are the	ici iis, tills is because of tiles	Sui vivai UI UIEII	

	a) Spores	b) Leaves	c) Fronds	d) Rhizomes		
1	66. If you are asked to classif	y the various algae into dis	tinct groups, which of the f	ollowing characters you		
	should choose?					
	a) Types of pigments pres	sent in the cell	b) Nature of stored food	materials in the cell		
	c) Structural organization	n of thallus	d) Chemical composition	of the cell wall		
1	67. Which of the following is	/are grouped under phane	rogams?			
	a) Angiosperms	b) Gymnosperms	c) Pteridophytes	d) Both (a) and (b)		
1	68. Calyptra is derived from					
	a) Archegonia	b) Capsule	c) Antheridia	d) Columella		
1	69. Megaspore mother cell di	videsA to give riseB.	megaspores			
	Identify the A and B and c	choose correct option				
	a) A-mitotically; B-two		b) A-mitiotically; B-four			
	c) A-amitotically; B-four		d) A-dinomitotically; B-fo	our		
1	70. In <i>Cycas</i>					
	a) Archegonia are presen	t	b) Antheridia are present	t		
	c) Archegonia are absent		d) Both (a) and (b)			
1	71. In angiospermic plant pol	llen grain reaches to embry	o sac after its germination	onA and throughB		
	Here A and B refer to					
	a) A-anther; B-micropyle		b) A-stigma; B-pollen tub	e		
	c) A-stigma; B-micropyle		d) A-anther; B-pollen tub	e		
1	72. Largest gametophyte is fo	ound in				
	a) Angiosperms	b) Polytrichum	c) Nephrolepis	d) Cycas		
1	73. Which is the source of tur	pentine oil?				
	a) Gymnospermic wood	b) Angiospermic wood	c) Gymnospermic seed	d) Angiospermic seed		
1	74. What is the ratio of equat	ional division that takes pl	ace in <i>Cycas</i> and angiosper	rms respectively during the		
	formation of male gamete	es from pollen grains?				
	a) 3 : 2	b) 3 : 1	c) 2 : 1	d) 2 : 3		
1	75. In moss, the sporophyte i	s differentiated into				
	a) Seta and capsule		b) Foot and seta			
	c) Protonema, foot and ca	apsule	d) Foot, seta and capsule			
1	76. In algae, sexual reproduct	tion takes place through th	e fusion of two			
	a) Spores	b) Fragments	c) Gametes	d) Zoospores		
1	77. In <i>Spirogyra</i> , sometimes	a ladder-like structure is p	present due to			
	a) Vegetative reproduction	on	b) Asexual reproduction			
	c) Lateral conjugation		d) Scalariform conjugation	on		
1	78. Embryo sac consists of					
	a) One egg cell		b) Two synergids			
	c) Three antipodal and tw	vo polar nuclei	d) All of the above			
1	79. Triple fusion in angiosper	rms is the fusion of second	male gamete with			
	a) Two polar nuclei (seco	ndary nucleus)	b) Two antipodal cells			
	c) One antipodal cell		d) Antipodal cell and one	synergid cell		
1	80. Carpel consists of					
	a) Style and stigma		b) Style, stigma and pistil			
	c) Style, anther and pistil		d) Anther, style and stign	na		
1	81. Which of the following is	the difference between a m	nonocotyledonous and a die	cotyledonous plant?		
	a) Both are gymnosperms	5	b) Monocot have two coty one cotyledons	yledons, whereas dicot have		
	 c) Monocot have one coty two cotyledons 	vledons whereas dicot have	e d) Monocot plants have o whereas dicot have tw	ne egg cell in embryo sac o egg cell in embryo sac		
1	82. Which of the following ch	aracteristic does not occur	in Pinus?			

a) The number of needles in a spur of <i>Pinus roxburghii</i> is three b) Each vascular bundle in the long shoot of <i>Pinus</i> consists of xylem facing towards the centre of the shoot c) Microsporophyll of <i>Pinus</i> bears two microsporangia				
d) <i>Pinus</i> is a homosp	orous gymnosperm			
183. Bryophytes are calle	d amphibians of plant king	dom because		
a) Their reproductiv	e phase requires water	b) Their sex organs ar	e multicellular and jacketed	
c) They have trachei	ds	d) All of the above		
184. Calyptra develops from the second s	om			
a) Venter wall of arc	hegonium	b) Outgrowth of game	tophyte	
c) Neck wall of arche	egonium	d) Paraphysis of the a	rchegonial branch	
185. Species of Sphagnur	n, a moss, provides			
a) Oil, that have long	been used as fuel	b) Peat (fuel)	b) Peat (fuel)	
c) Agar-agar		d) Antibiotic		
186. Spirogyral lateral co	njugation takes place in			
a) Heterosporous sp	ecies	b) Homosporous spec	ies	
c) Heterothallic spec	ries	d) Homothallic specie	S	
187. Which one of the foll	owing classes is included u	inder gymnosperms?		
a) Lycopsida	b) Bryopsida	c) Cycadopsida	d) Pteropsida	
188. Study the following a	and identify two characters	s found in both <i>Cycas</i> and <i>Pt</i>	eris.	
I. Formation of motil	e male gametes.			
II. Formation of hapl	oid endosperm.			
III. Formation of spo	rophyte directly from game	etophyte without gametic un	ion.	
IV. Formation of arch	negonia in female gametop	hyte.		
The correct match is				
a) I and IV	b) I and III	c) II and IV	d) III and IV	
189. Iodine is found in alg	ae			
a) Ulva	b) Ulothrix	c) Chlorella	d) <i>Laminaria</i>	
190. The members of alga	e reproduce by			
a) Vegetative metho	d b) Asexual method	c) Sexual method	d) All of these	
191. Consider the following	ng statements about sexua	l reproduction in brown alga	e?	
I. Sexual reproductio	n may be oogamous isogar	nous or anisogamous		
II. Union of gametes	take place in water or with	in the oogonium		
III. The gametes are	pear-shaped and bear two	laterally attached flagella		
Which of the stateme	ents given above are correc	ct?		
a) I and II	b) I and III	c) II and III	d) I, II and III	
192. Which of the following	ng is known as 'bog moss'?			
a) Polytrichum	b) Funaria	c) Sphagnum	d) Porella	
193. Which of the following	ng has multiflagellate speri	ms?		
a) Equisetum	b) Riccia	c) Lycopodium	d) Anthoceros	
194. Angiospermic plants	are divided into			
a) Dicot		b) Monocot		
c) Both (a) and (b)		d) Heart wood plant a	nd sapwood plant	
195. Cycas seed is				
a) Dicotyledonous		b) Monocotyledonous		
c) Dicotyledonous, n	on-endospermic	d) Monocotyledonous	, endospermic	
196. The correct statemen	nts about bryophytes are			
I. the sperms are bifl	agellate			
II. the sperms are rel	eased into water and fuses	s with the egg to produce the	zygote out side the body	
III. zygotes undergoe	III. zygotes undergoes reduction division immediately			
IV. they produce a m	ulticellular body called a s	porophyte		

 a) I, II and III b) I, II and IV 197. Which of the following is pteridophytes belong to cl a) Equisetum and Psilotum b) Luconodium and Adjantum 	c) I and IV ass-Pteropsida?	d) III and IV
c) Selaginella and Pteris		
d) Pteris and Adiantum		
198. The 13-celled male gametophyte in <i>Selaginella</i> is	h) 10 colle of anthoridium	a + 2 prothallial colle
c) 8 cells of antheridium $+ 2$ prothallial cells	d) None of the above	ii + 5 protitalilai celis
199. In haplontic life cycle, the dominant generation is		
a) Sporophyte b) Gametophyte	c) Both (a) and (b)	d) None of the above
200. Carrageenin, a jelly-like substance is obtained from		
a) Chondrus b) Fucus	c) Sargassum	d) Ulothrix
201. While entering in the neck of a fern archegonium, sp	perms shows	
a) Phototaxy b) Chemotaxy	c) Thermotaxy	d) Cyclosis
202. Which one of the following plants is monoecious?	a) Cuere	d) Domorro
a) Marchantia D) Pinus	c) Lycas	d) Papaya
a) 24 b) 16	c) 12	d) 8
204. Tea and coffee are affected by	c) 12	uj o
a) <i>Phytophthora</i> b) <i>Cephaleuros</i>	c) Herviella	d) Albugo candida
205. Which of the following groups of algae do not have e	eukaryotic organization?	, .
a) Green algae b) Blue-green algae	c) Red algae	d) Golden-brown algae
206. In gymnosperms, during pollination pollen grains an	re released from the micros	sporangium and transferred
to		
a) Opening of the ovule	b) Archegonia	
c) Ovary	d) Stigma	
207. In <i>Funaria</i> , the stomata are found on		
a) Foot b) Seta	c) capsule	d) All of these
200. Diatonis belong to which class?	c) Chlorophycese	d) Vanthonhuceae
209 Which of the following statement is correct about th	e gametonhytic stage in th	e alteration of generation
with in the life cycle?	ie gametopnytie stage in th	e alteration of generation
a) Generation that produces the gametes	b) Generation that produ	ces the spores
c) Generation that produces vascular tissue	d) The diploid generation	1
210. Go through the following figures and identify these	plants (A, B, C and D)	
- Strobilus		
Node		
Internode		
Leaves		
Stem		
Rhizome		
AB		
C D		

a) A-Equisetum, B-Selaginella, C-Fern, D-Salvinia

b) A <i>-Selaginella,</i> B <i>-Equisetum,</i> C <i>-Fern,</i> D <i>-Salvinia</i>		
c) A- <i>Fern,</i> B <i>-Salvinia,</i> C <i>- Equisetum,</i> D- <i>Selaginella</i>		
d) A <i>- Salvinia,</i> B- <i>Equisetum,</i> C <i>- Fern</i> , D <i>-Selaginella</i>		
211. Transfer of pollen grain from anther to the stigma	of ovary is called	
a) Autogamy b) Pollination	c) Syngamy	d) Allogamy
212. Which of the following gymnosperms is a bushy tra	ailing shrub?	
a) <i>Ephedra</i> b) <i>Cycas</i>	c) Pinus	d) Araucaria
213. Which of the following taxa shows zooidogamous of	ogamy?	2
I. Spirogyra II. Funaria	0	
III. Pteris IV. Cycas		
a) I. II and III b) I. III and IV	c) I. II and IV	d) II. III and IV
214. Which of the following options correctly identifies	the plants their groups fro	m the following structure?
	the plants then groups no	
eves antheridial Seta Leaves Antheridial Branches Branches Anthegonial branch Anthegonial branch Branches		
a) A- <i>Funaria</i> -Moss: B- <i>Sphagnum</i> -Moss		
h) A- <i>Funaria</i> -Liverwort: B- <i>Snhagnum</i> -Moss		
c) A- <i>Selaginella</i> -Bryonhytes: B- <i>Funaria</i> -Liverwort		
d) A- <i>Selaginella</i> -Pteridonhytes: B- <i>Funaria</i> -Moss		
215. Smallest flowering plant is		
a) <i>Ginkgo</i> b) <i>Wolffia</i>	c) Tulin	d) Sweet hav
216 Cymnosperms lack fruits why?	cj runp	aj Sweet bay
a) Speds absent b) Ovule absent	c) Ovary absent	d) Ovary fused
217 Funaria Polytrichum and Snhaanum are the exa	mples of	uj ovary luseu
a) Liverworts b) Ferns	c) Mosses	d) Pteridonhytes
218 Pollen sac in <i>Cycas</i> is called		uj i teridopilytes
a) Megasnoronhyll b) Megasnorangium	c) Microsporophyll	d) Microsporangium
219 Chlorenchyma is known to develop in the	ej merosporopnyn	u) merosporangium
a) Spore cancule of a moss	b) Pollen tube of Pinus	
a) Spore capsule of a moss	d) Mycelium of a green	mould such as Asperaillus
220 Bryonhytos are also called 'amphibians of the plant	t kingdom' bocauso	mould such as Asper gillus
a) Water is essential for reproduction	t Killguolli Decause	
b) They are accur in only water		
c) These plants can live in soil but are dependent of	on water for covual reprodu	uction
d) Water is accontial for spore formation	m water for sexual reprout	
221 Device another system of classification was given by		
221. Finylogenetic system of classification was given by	a) Linnaaya	d) Dontham and Haalaar
a) Engler and Pranti D) Aristote	cj Linnaeus	d) Bentham and Hooker
222. which was first photosynthetic organism?	a) Create the state of	d) None -fth-
a) Green algae DJ Ked algae	cj Lyanobacteria	a) none of these
223. Male and remale gametophytes are independent ar	iu iree-living in	
a) Mustard b) Castor	c) Pinus	a) Spnagnum
224. Uniamyaomonas, Volvox, Ulothrix, Spirogyra an	a <i>chara</i> are the examples	01
a) Class-Chlorophyceae (green algae)		
b) Class-Phaeophyceae (brown algae)		
c) Class-Rhodophyceae (red algae)		

d) Class-Cyanophyceae	(blue-green algae) and Chl	orphyceae	
225. Consider the following	statements		
I. Agar, one of the comm	nercial products obtained fr	rom Gelidium and Gracilar	<i>ia</i> are used to grow
microbes and in prepar	ations of ice-creams and jel	llies	
II. Chlorella and Spirog	<i>gyra</i> are used in sewage dis	sposal ponds	
III. Some species of mar	rine algae like Porphyra, Lo	aminaria and Sargassum a	are used as food
Which of the statement	s given above are correct?		
a) I and II	b) I and III	c) II and III	d) I, II and III
226. In gymnosperm, the mu	ılticellular female gametopl	nyte is retained with in	
a) Microsporangium	b) Megasporangium	c) Male gametophyte	d) Archegonia
227. Choose the wrong pair			
a) Hepaticopsida - <i>Ma</i>	rchantia	b) Lycopsida - Selagine	ella
c) Bryopsida - Anthoc	eros	d) Pteropsida - Dryopt	eris
228. Cycas circinalis is a so	urce of		
a) Resin	b) Timber	c) Essential oil	d) Starch
229. The endosperm in angio	osperms develops from		
a) Zygote		b) Secondary nucleus	
c) Chalazal polar nucleu	JS	d) Micropylar polar nuc	leus
230. A microsporophyll in <i>P</i>	<i>inus</i> has		
a) One microsporangiu	m on the adaxial side	b) One microsporangium	n on the abaxial side
c) Two microsporangia	on the abaxial side	d) Two microsporangia	on the adaxial side
231. The algae used in space	research is		
a) Cephaleuros	b) <i>Gelidium</i>	c) Chlorella	d) Gracilaria
232. Horse tails and ferns ar	e belongs to		
a) Gymnosperms	b) Bryophytes	c) Mosses	d) Pteridophytes
233. Chloroplasts, with pyre	noid like structures are fou	nd in the leaves of	
a) Funaria	b) Cycas	c) Selaginella	d) Zea mays
234. Bryophytes mostly occu	ır in		
a) Dry area		b) Terrestrial area	
c) Humid, damp and sh	aded localities	d) in water	
235. The number of prothall	ial cells in male gametophy	te of Pinus is	
a) 2	b) 1	c) 3	d) 0
236. A, B, C and D in given figure A	gure represents		
c			
В			
Leaves			
D			
Main axis			
L Phile Rhizoids	5		
a) A-Anophysis B-Cans	ula C-Sporophyta D-Cama	tonhuto	
b) A-Cansula B-Seta C-	Sporonhyte D-Gametonhyt		
c) A-Anonhysis B-Seta	C-Cametonbyte D-Sporon	hvto	
d) A-Anonhveis R-Cane	ule C-Gametonhyte D-Sporop	ronhvte	
237. The hody structure of g	reen algae may he	opily to	
a) Colonial	b) Unicellular	c) Filamentous	d) All of these
aj coroniai	Sj emeenduu	ej i namentous	a, in or these

	to any and stated with N	Guine and the starie?
238. Which of the following gymnospermic corolloid roo	c_2 $Codrug$	-fixing cyanobacteria?
a) <i>Fillus</i> U) <i>Cycas</i>	c) ceurus	uj <i>Gilikgo</i>
a) Linnaus		
a) Engler and Prantl		
c) Bontham and Hookor		
d) Aristotle		
240 Angiosporms differ from gymposporms in having		
240. Anglosperins unter nom gynnosperins in naving	c) Trachoide	d) Broad loaves
241 Consider the following statements regarding gump	c) fractients	uj biodu leaves
L In gumposporms, the male and female genetanty	tos have an independent.	orietonco
I. In gynniosperins, the male and temale gametophy II. The multicellular female gametophyte is retained	d within the measurement	ium
II. The multicentual female gametophyte is fetamet	a within the megasporang	10111.
Of these statements		
a) Land II are true but III is false	h) I and III are true but	II is false
a) I and III are false but L is true	d) II and III are true but	II IS Idise
242 Dellen tube corrige	d) II and III are true bu	t i is faise
242. Polieli tube carries	a) Thurso are arrived	d) Eaur an anns
a) Two male gametes b) One male gamete	c) Three sperms	a) Four sperms
243. Sanjeevani booti is	h) Colorationalla channes	
a) Selaginella kraussiana	b) Selaginella chrysoc	aculos
C) Setaginetta differen from Francois in herring	d) None of the above	
244. Dryopteris differs from Funaria in having		
a) An independent gametophyte	b) An independent spoi	ropnyte
c) Swimming antherozoids	d) Archegonia	
245. Retort cells occur in		
a) Funaria b) Pogonatum	c) Porella	d) Sphagnum
246. <i>Chlamydomonas</i> occurs in		N 0
a) Freshwater b) Ponds and lake	c) River	d) Ocean
247. Select the correct statements.		
a) Absorption of water by seeds and dry wood are	b) The apoplast is the s	ystem of interconnected
examples of facilitated diffusion	protopiasts	
c)	a) The translocation in	phioem is unidirectional,
240. The members of Chlorenburges are usually group of	whereas in the xylen	an it is bluirectional
248. The members of Uniorophyceae are usually green c	lue to the dominance of pi	gments
a) Chlorenkull a and b	d) Chlorophyll-D	
c) Uniorophyli- a and b	a) Chlorophyll- <i>c</i>	
249. Winged pollen grains are found in	a) Dtania	d) Coloniu alla
a) <i>Lycas</i> b) <i>Pinus</i>	c) Pteris	a) Selaginella
250. Which region is responsible for origin of rhizoids if	Funaria?	
a) Lateral region b) Dorsal region	c) ventral region	d) Basal region
251. Endosperm formation begin with		
a) The establishment of the suspensor		
b) The furtilization of the antipodals		
c) The fertilisation of the polar nuclei		
a) The syncytial development of the embryo	(
252. Gametophyte is the dominant phase in the life cycle		d) Diation
a) <i>Hibiscus</i> DJ <i>Nephrolepis</i>	cj cycas	aj <i>Riccia</i>
255. which one of the following is a vascular cryptogam	(a) Man-hti	d) Coderer
a) Equisetum D) Ginkgo	cj marchantia	aj <i>Learus</i>
254. Consider the following statements		

	I. The liverworts grow us soil, bark of trees and dee	ually in moist, shady habita	ts such as banks of stream	s, marshy ground, damp
	II. The leafy members of l	iverwort have tiny leaf-like	e appendages in two rows o	on the stem-like structures
	Choose the correct option	h) Liafalao ILiatmuo	a) I and II and true	d) Land II are folge
255.	The giant red wood tree (Sequoia) is a/an	c) I and II are true	uj i anu il are laise
	a) Angiosperm	b) Fern	c) Pteridophyte	d) Gymnosperm
256.	Which of the following st	atements is wrong about bi	ryophytes?	
	a) Fertilization takes place	e in presence of water		
	b) Gametophytic place is	dominant in life cycle	tonhuto	
	d) Zvgote undergoes mei	osis to produce sporophyte	etopilyte	
257.	Choose the correct staten	nent about liverworts	-	
	I. In liverworts sexual rep	production occurs by the fu	sion of antherozoids and eg	gg, which are produced in
	anthridium and archegon	ium, respectively		
	II. Both male and female s	sex organs may be present	on same thalli or different t	thalli
	III. Zygote give rise to spo	prophyte, which is different	iated into food, seta and ca	psule
	a) I II and III	h) II. III and IV	c) I III and IV	VI bre III II (b
258.	Spore dissemination in so	ome liverworts is aided by		uj 1, 11, 111 anu 1v
2001	a) Elaters	b) Indusium	c) Calyptras	d) Peristome teeth
259.	If a sporangium is derived	d from a single cell, it is call	ed	,
	a) Leptosporangiate	b) Eusporangiate	c) Heterosporangiate	d) Monosporangiate
260.	Dispersal of spores in fer	n takes place through		
	a) Annulus	b) Stomium	c) Both (a) and (b)	d) Indusium
261.	Members of class-Rhodor	bhyceae are known as red a	ligae due to the presence of	red pigment
262	a) <i>r</i> -phycoerythrin	b) <i>r</i> -xanthophyll	c) Phycoerythrin	d) Fucoxanthin
202.	a) <i>Chlorella</i>	h) Sniruling	c) Sniroavra	d) Illothrix
263.	Water bloom is generally	caused by	ej opnogyra	
	a) Green algae	b) Blue-green algae	c) Bacteria	d) Hydrilla
264.	Phylogenetic system of cl	assification is based upon		
	a) Evolutionary relations	hip of organism	b) Cytological information	n
	c) Structural embryology		d) All of the above	
265.	Both heterospory and cir	cinate ptyxis occur in		
266	a) Dryoteris	b) Pinus	c) Lycas	a) Funaria
200.	a) Hanloid	b) Dinloid	c) Triploid	d) Tetranloid
267.	How many pyrenoids are	present in the members of	class-Chlorophyceae?	uj retrupiota
-	a) One	b) Two	c) One to many	d) Pyrenoids are absent
268.	Choose the incorrect stat	ement		
	a) Double fertilisation is	unique to gymnosperms an	d monocotyledons	
	b) Sequoia, a gymnosperi	n, is one of the tallest trees		
	c) Phaeophyceae membe	rs possess chlorophyll- <i>a, c,</i>	carotenoids and xanthoph	ylls
260	d) Moss is a gametophyte	, which consists of two stag	ges namely, protonema stag	ge and leafy stage
209.	a) <i>Chlorella</i>	aiga is h) <i>Snirulina</i>	c) Spirogyra	d) <i>Illothrix</i>
270.	Spores with chloroplast is	s present in	<i>5, 51105110</i>	aj olomin
	a) Selaginella	b) Equisetum	c) Puccinia	d) Rhizopus
271	The leaves in pteridophy	es are small as in		

a) <i>Volvox</i>	b) <i>Marsilia</i>	c) <i>Selaginella</i>	d) <i>Azolla</i>
272. In bryophytes antheridi	um producesA and fem	ale sex organ archegonium	producesB Here A and
B refer to			
a) A-uniflagellate anthe	rozoids; B-two egg	b) A-biflagellate anthero	ozoids; B-one egg
c) A-non-motile anthero	zoids; B-one egg	d) A-non-motile anthero	ozoids; B-two egg
273. In case of heteroporous	pteridophyte the gametoph	ıyte is	
a) Always dioecious		b) Monoecious	
c) May be monoecious o	r dioecious	d) Vascular	
274. Oogamous type of fusion	n is found in		
a) <i>Volvox</i> and <i>Fucus</i>	b) <i>Chlamydomonas</i>	c) <i>Spirogyra</i>	d) All of these
275. Fern gametophyte bears	5		
a) Archegonia	b) Antheridia	c) Sporangia	d) Both (a) and (b)
276. Gametophyte is domina	nt stage in the life cycle of		
a) Bryophyta	b) Pteridophyta	c) Angiosperms	d) Gymnosperms
277. The plant body of bryop	hytes is		
a) More differentiated t	nan that of algae		
b) Equally differentiated	l to that of algae		
c) Less differentiated th	an that of algae		
d) Is not differentiated a	tall		
278. In gymnosperms the dev	velopment of grains take pl	ace with in the	
a) Megasporangia			
b) Microsporangia			
c) Male gametophyte			
d) Female gametophyte			
279. In angiospermic fertilisa	ition, one male gamete fuse	s with egg to formA , th	nis event is calledB
Identify A and B and cho	ose the correct option		
a) A-endosperm: B-syng	amv		
b) A-zvgote: B-svngamv			
c) A-embryo: B-triple fu	sion		
d) A-endosperm: B-tripl	e fusion		
280. Classification on the bas	is of all observed character	rs is known as	
a) Number and codes ta	xonomv	b) Numerical taxonomy	
c) Countable taxonomy	nonomy	d) Numerical informatio	on taxonomy
281 Spirogyra Volvox and	Chlamydomonas shows		
a) Haplontic life cycle		h) Diplontic life cycle	
c) Haplo-diplontic life o	zcle	d) Diplohiontic life cycle	x
282 When moss snores gern	vinate the form	uj Dipiobiolitic lite eyele	-
a) Leafy gametonbyte	h) Cansule	c) Protonema	d) Bhizoids
283 A fern differs from a mo	ss in having	ej i rotonema	uj mizolus
a) Swimming archegoni	33 III IIAVIII5	h) Swimming antherozo	ide
c) Independent gametor	nhutas	d) Independent sporoph	
284. If the chromosome num	her in the leaf of <i>Funaria</i> is	s 20 what will be the chror	nosome number in the
spores ²		5 20, what will be the chi of	nosome number in the
2 10	b) 40	a) 20	4) E
a) 10 205 Descridenbytes differ from	b) fu	0 20	u) 5
205. r terraophytes affer from	in oryophytes in the	h) Vacculature	
a) Archogonia		d) Alternation of government	tion
C) AI CHEgolilla		uj Alternation of genera	uon
200. Lycus stelli snows	h) Managerlia wood	a) Duanavalia waad	d) Ding paraya wood
aj rorous wood	UJ Manoxync Wood	cj rychoxylic Wood	u) King porous Wood
207. In which group of the fo	nowing would you place th	e plants having vascular tis	sue and lacking seeds?

	h) Eungi	a) Dryconbytec	d) Dtaridanhutaa
288 In brown algae food i	DJ Fuligi s stored in the form of	c) bryophytes	u) Pteridophytes
200. III DI OWII algae, 1000 I.	b) Laminarin starch	c) Both (a) and (b)	d) Algin
280 Hanloid brown bairlil	bj Lannarni Starch	rowths are	u) Algin
a) Root hairs of gran	osporms	h) Paranhysis of mosses	
c) Root nodules of nul	leas	d) Rhizoids of forn plant	
290 Cymposperms produc	re neither flower nor fruit h	ecause they do not possess	
2 Jo. dynniosperins produc	h) Ovary		d) Seed
291 In mosses the second	gametonhytic stage is leafy	stage Consider the following	g statements about leafy
stage	gametophytic stage is leary	stage. consider the following	g statements about leary
L Leafy stage is produ	ced from the secondary pro	tonema as a lateral hud	
II They consist of unr	ight slender axes hearing sr	nirally arranged leaves	
III They are attached	to the soil through multicell	lular rhizoids	
IV. This leafy stage he	ars the sex organ		
Which of the statemer	its given above are correct?	1	
a) I. II and III	b) I. III and IV	c) II. III and IV	d) I. II. III and IV
292. Alginic acid is found in	n the cell wall of	0) 11, 111 0110 11	ay 1, 1, 11 and 1
a) Gigartina	b) Laminaria	c) Gelidium	d) Scytonema
293. Incorrect character of	brown alga is	-)	.,
a) Chlorophyll- <i>a</i> and <i>l</i>	b present	b) They remain attached	d
c) Chlorophyll- a and a	<i>c</i> present	d) Presence of fucoxant	hin
294. Plants forming spores	but lacking seed and vascu	lar tissue are	
a) Gymnosperms	b) Angiosperms	c) Bryophytes	d) Pteridophytes
295. Living fossil is	0 0 - F	J J I J I J	
a) <i>Ginkgo biloba</i>	b) Gnetum ulva	c) Pinus roxburghii	d) Cycas revoluta
296. Acetabularia is a	,	,	
a) Single-celled marin	le green alga	b) Multicelled marine gr	reen alga
c) Single-celled freshv	water green alga	d) Multicelled freshwate	er green alga
297. Which of these is misr	natched?		
a) Phaneros - Visible	1	b) Kryptos - Concealed	
c) Gymno - Naked		d) Bryon - Liverworts	
298. The sclerenchyma of t	he hypodermis in the Pinus	s needle helps in	
a) Increasing the abso	orptive surface of the cell	b) Checking transpiration	on
c) Mechanical suppor	t	d) Photosynthesis	
299. Most algal genera are	haplontic some of them suc	h asA,B andC are	e haplo-diplontic. Here A, B
and C refers to			
a) A- <i>Ectocarpus</i> , B- <i>Po</i>	olysiphonia, C- <i>Kelps</i>		
b) A- <i>Volvox</i> , B- <i>Spirog</i>	<i>yra</i> , C- <i>Kelps</i>		
c) A- <i>Spirogyra</i> , B- <i>Pol</i> y	<i>vsiphonia</i> , C- <i>Ectocarpus</i>		
d) A- <i>Volvox</i> , B- <i>Kelps,</i>	C- <i>Ectocarpus</i>		
300. From which of the foll	lowing algae, agar-agar is co	ommercially extracted?	
I. Gracilaria II. Fuc	cus		
III. Sargassum IV. Gel	lidium		
V. Turbinaria			
a) III and V	b) II and III	c) IV and V	d) I and IV
301. In gymnosperms one	of the megaspores develops	into multicellular structure	called multicellular that
bears two or more arc	chegonia		
a) Male gametophyte			
b) Female gamete			
c) Female gametophy	te		

 d) Male gamete 302. If the leaf of <i>Funaria</i> has 5 chromosomes the primary protonema will have a) 10 chromosomes b) 5 chromosomes c) 15 chromosomes d) 20 ch			
302. If the real of Purant it has 5 Chromosomes (c) 15 Chromosomes (d) 20 Chromosomes 303. In gymnosperms the reduced gametophyte is called a) Endospore (b) Pollen grain (c) Ovule (c) Aplanospore 304. Double fertilisation occurs among a) Algae (c) Purant (c) Prophytes (c) Angiosperms (c) Cymnosperms 305. In algae assual reproduction occurs by the production of different types of spore is a) Aplanospore (c) Coospore (c) Oospore (c) Coospore (c) Coospore (c) Oospore (c) Coospore (c) Oospore (c) Coospore (c) Oospore (c) Coospore (c) Coospore (c) Coospore (c) Oospore (c) Coospore (c) Oospore (c) Coospore (c) Coospore (c) Coospore (c) Coospore (c) Coospore (c) Coospore (c) Oospore (c) Colorophyll-a, b (c) (c) Conidia (c)	d) Male gamete	a will have	
a) For monosperms the reduced gametophytes is called a) Endospore b) Pollen grain c) Ovule d) Aplanospore 304. Double fertilisation occurs among a) Algae b) Bryophytes c) Angiosperms d) Gymnosperms 305. In algae asexual reproduction occurs by the production of different types of spores. The most common type of spore is a) Aplanospore b) Endospore c) Zoospore d) Oospore 306. In green algae vegetative reproduction takes place by a) Fragmentation b) Different types of spores c) Both (a) and (b) d) conidia 307. Photosynthetic pigments of class-Rhodophyceae (ref algae) are a) Chlorophyll-a, b b) Chlorophyll-a, c c) Chlorophyll-a, d d) Chlorophyll-a, cand d 308. In a moss, the sporophyte a) Is partially parasitic on the gametophyte b) Produces gametes that give rise to the gametophyte c) Arises from a spore produced from the d) Manufactures food for itself, as well as for the gametophyte 304. They are not seedless b) They are not pollinated c) They have no ovary d) Pertilization does not takes place 310. Haplontic life cycle is followed by a) Algae b) Fungi c) Gymnosperms d) Angiosperms 311. Which of the following pteridophytes is heterosporous a) <i>Psilotum</i> b) Adlantum c) <i>Equestum</i> d) <i>Salivinia</i> 312. Resin duct of gymnospermous stem is an example of a) Lysigenous cavity b) Lysogenous cavity c) Schizogenous cavity d) Schizolysigenous cavity 313. Fortilisation is the process of a) Transfer the pollen from anther to stigma b) Fusion of one male gamete with the egg c) Formation of seed from ovule d) Fusion of male nucleus with polar nuclei 314. Angiosperms are also called a) Scel less plants b) Futis less plants c) Flowering plants d) All of these 315. Read carefully the following statements 1. <i>Funaria</i> possesse unicellular and unbranched rhizoids 11. Genmae are assexual buds, which originate from small receptacles called gemma cups 11. The <i>Sphagmun</i> plants have magnificent property of retaining water 1. <i>Funaria</i> possesses unicellular and unbranched rhizoids 11. Genmae are ass	302. If the leaf of <i>Funaria</i> has 5 chromosomes the prin	c) 15 chromosomos	d) 20 chromosomos
 Soon Mynusoperine one Potencial and Columbration of Columnation of Colum	303 In gymnosperms the reduced gametonbyte is calle	2d	uj zo chi omosomes
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305. In algae asexual reproduction occurs by the production of different types of spores. The most common type of spore is a) Aplanospore b) Endospore a) Aplanospore b) Endospore d) Cospore 306. In green algae vegetative reproduction takes place by a) Fragmentation b) Different types of spores c) Both (a) and (b) d) Conidia 307. Photosynthetic pigments of class-Rhodophyceae (red algae) are a) Chlorophyll-a, <i>c</i> c) Chlorophyll-a, <i>d</i> d) Chlorophyll-a, <i>c</i> and <i>d</i> 308. In a moss, the sporophyte b) Different types of por is is even to the gametophyte b) Produces gametes that give rise to the gametophyte a) Is partially parasitic on the gametophyte b) Produces gametes that give rise to the gametophyte gametophyte 309. Fruits are not found in gymnosperms because a) They are not seedless b) They are not pollinated c) They have no ovary d) Fertilization does not takes place 310. Haplontic life cycle is followed by a) Algae b) Fungi a) Algae following pteridophytes is heterosprorus a) Algaesory c) Forward and the set of gametos of table and the set of gametos of the gametos of the gameto set of the gametos of the gameto set of the gametos of the gametory withe dege () Formation of seed from ovule c	a) Algae b) Bryophytes	c) Angiosperms	d) Gymnosperms
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cJ Endospores (round and have one flagella) d) Multifilagellate gametes and are sickle-shaped	b) Biflagellate gametes (pear-shaped and have two	o unequal flagella)	
d) Multifilagellate gametes and are sickle-shaped	c) Endospores (round and have one flagella)		
	a) Multifliageliate gametes and are sickle-shaped		

317. Sporophyte of fern produ	ices		
a) Pollen grains	b) Spores	c) Seeds	d) Gametes
318. Fern spores are usually			
a) Haploid	b) Diploid	c) Triploid	d) Tetraploid
319. In <i>Cycas</i> , diploxylic vascu	ılar bundles are found in		
a) Stem	b) Root	c) Leaflet	d) Rachis and leaflet
320. A group of plants which a	re autotrophs, their sex or	gans are non-jacketed and	whose zygotes secrete thick
wall are called			
a) Phycophytes	b) Lichens	c) Bryophytes	d) Thallophytes
321. Peat moss is			
a) Funaria	b) Fern	c) Algae	d) Sphagnum
322. The main plant body in p	teridophyte is		
a) Sporophyte (2n) which a) stem and leaf	h is differentiated into root	, b) Sporophyte having no	root, stem and leaf
c) Gametophyte (n) which stem and leaf	h is differentiated into roo	t, d) Gametophyte having n	io root, stem and leaf
323. Consider the following st	atement regarding heteros	pory	
I. Genera like Selaginella	and Salvinia which produ	ice two kinds of spores, ma	acro (large) and micro
(small) spores, are know	n as heterosporous	•	
II. The megaspores and m	nicrospores germinate and	give rise to female and mal	le gametophyte respectively
III. The female gametoph	ytes in these plants are reta	ained on the parent sporop	hytes for variable periods
IV. The development of th	ne zygotes into young embr	yos takes place within the	female gametophytes
V. This event is a precurs	or to the seed habit conside	ered an important step in e	volution
a) I, II and III	b) II, IV and V	c) III, IV and V	d) I, II, III, IV and V
324. Common characteristic b	etween bryophytes and pte	eridophytes is	
a) Vascularization		b) Terrestrial habit	
c) Water for fertilization		d) Independent sporophy	yte
325. Two very distinst genera	tions are found in the life cy	ycle of	
a) Bacteria	b) <i>Spirogyra</i>	c) <i>Volvox</i>	d) Ferns
326. Prothallus of the fern pro	duces		
a) Spores	b) Gametes	c) Both (a) and (b)	d) Cones
327. Dominant generation in b	oryophytes is		
a) Capsule	b) Sporophyte	c) Gametophyte	d) Seta
328. In gymnosperms, pollinat	tion takes place by		
a) Water	b) Air	c) Insects	d) Animals
329. A and B in given figure re	epresents		
A Branches			
a) A-Gametophyte brancl	h, B-Sporophyte branch	b) A-Antheridial branch,	B-Archegonial branch
c) A-Archegonial branch,	B-Antheridial branch	d) A-Sporophyte branch,	B-Gametophyte branch
330. Incipient nucleus is found	l in		
a) Myxophyceae 331. Conifers differ from grass	b) Phaeophyceae ses in the	c) Rhodophyceae	d) Chlorophyceae
a) Production of seeds fro	om ovules	b) Lack of xylem tracheid	ls
			Page 22

c) Absence of pollen tubes 332. Which of the following is correct the ploidy level in l	d) Formation of endospe abelled organs of plant sh	erm before fertilization own in given figure?
Sporophyte Antheridia Rhizoids		
a) Sporophyte-Diploid (2 <i>n</i>) c) Rhizoids – Haploid (<i>n</i>)	b) Antheridia-Haploid (. d) All of the above	<i>n</i>)
333. Non-motile, greatly thickened, asexual spore in Chla	mydomonas is	
a) Carpospores b) Akinetes	c) Aplanospores	d) Hypnospores
334. Consider the following statements about brown alga	e	
I. The largest kelps are Nereocystis and Macrocyst	is	
II. Brown algae have gelatinous coating outside the,	cellulosic cell wall called a	algin
III. Food obtained from Laminaria saccharina is kn	own as 'Kombu'	
Which of the statements given above are correct?		
a) I and II b) I and III	c) II and III	d) I, II and III
335. Double fertilisation is characteristic feature of		
a) Gymnosperms b) Angiosperms	c) Monocoats	d) Bryophytes
336. Identify A, B and C in the following figure and choos	e the correct option	
Rhizome		
a) A-Strobilus, B-Node, C-leaves	b) A-Strobilus, B-node, (C-branch
c) A-Sporophyll, B-Node, C-Internode	d) A-Sporophyll, B-Inter	node, C-Node
337. Reproductive parts of an angiospermic plant are		
a) Stamen b) Pistil	c) Both (a) and (b)	d) Shoot
338. After fertilisation the ovaries develop into		d) Internete
a) Fruit b) Seed coats	c) Seed	a) integuments
339. Which of the following algae are suitable for human	consumption?	dana
a) Luminuriu and Fucus	d) Dhadamania and Da	urus mahama
c) Porphyra and Spirogyra	d) Rhoaymania and Po	rpnyra
340. In <i>Ototarix</i> , melosis occurs in	a) 7. a a m a m a	d) Thellus
a) Gamete DJ Zygospore	cj zoospore	uj manus
a) Iuvenile stage of moss is protonoma		
a) juvenine stage of inoss is protonening system of	filaments	
c) Develops directly from a spore	maniciits	
		Pag

d) All of the above			
342. Fruits are mature			ן ו מון
a) Ovules	b) Ovaries	c) Flower	d) Peduncles
343. Megasporophyll of <i>Lyce</i>	as is equivalent to		
a) Stamen	b) Sepai	c) Petal	d) Carpel
344. Mosses (along with lich	en) are of great ecological ir	nportance because	
a) They colonise on bar rock	ren rocks and decompose	b) its contribution to pro-	event soll erosion
c) Its contribution in ec	ological succession	d) All of the above	
345. Microsporangia of Cyca	s occur over microsporophy	yll	
a) Laterally	b) Abaxially	c) Adaxially	d) Marginally
346. The plant body of bryog	ohytes are thallus like, prost	rate or erect and attached	to substratum with the help
of			
a) Unicellular or multic	ellular roots	b) Unicellular or multice	ellular rhizoids
c) Multicellular roots		d) Unicellular roots	
347. Heterospory is the proc	luction of		
a) Sexual and asexual s	pores	b) Large and small spore	es
c) Haploid and diploid s	spores	d) Diploid and tetraploid spores	
348. Bryophytes include			
a) Liverworts and moss	ses		
b) Lycopods and mosse	S		
c) Lycopods and liverw	orts		
d) Liverworts and <i>Volv</i>	OX		
349. About 90% of the total	green algae is found in		
a) Marine environment		b) Freshwater environm	ient
c) Rivers		d) Terrestrical environ	nent
350. Mosses are attached to	substratum by		
a) Roots	b) Capsule	c) Rhizoids	d) Main axis
351. Oil is reserve food in			
a) Chlamydomonas	b) Oedogonium	c) Vaucheria	d) Chara
352. Coralloid roots of <i>Cyca</i>	s are useful in		
a) N_2 – fixation	b) Absorption	c) Transpiration	d) Fixation
353. The type of pollination	in <i>Cycas</i> is		
a) Entomophily	b) Hydrophily	c) Anemophily	d) Malacophily
354. Spore of <i>Funaria</i> on ge	rmination gives rise to		
a) Protonema	b) Sporophyte	c) Prothallus	d) Capsule
355. Eutrophication is the re	esult of		
a) Bryophyte		b) Algae and aquatic pla	nts
c) Gymnosperm		d) Pteridophyte	
356. Identify the given figure	es of algae and select the cor	rect option	

Parent colony A B		
\\\\//7>Branches		
Axis		
a) A- <i>Chlamydomonas</i> , B- <i>Chara</i> , C- <i>Volvox</i>	b) A- <i>Volvox</i> , B- <i>Chlamyd</i>	omonas, C- <i>Chara</i>
c) A- <i>Chara</i> , B- <i>Laminaria</i> , C- <i>Volvox</i>	d) A- <i>Porphyra</i> , B- <i>Polysi</i>	<i>phonia</i> , C- <i>Fucus</i>
357. If number of chromosomes in foot of fern embryo is	8, what should be the nun	nber in its spores?
a) 4 b) 8	c) 23	d) 16
358. Agar-agar is obtained from		
a) Chlorella b) Spirogyra	c) Ulothrix	d) Gelidium
359. The alga rich in protein is		
a) Chlorella b) Ulothrix	c) Laminaria	d) Nostoc
360. A typical of angiospermic embryo sac is usually		
a) One celled b) Three celled	c) Five celled	d) Seven celled
361. Female reproductive part of bryophytes is	a) Arrah a arraitana	d) C.,
262 Which of the following group of marine algae are up	c) Archegomum	d) Sporangium
a) Chlamydomonas Volvoy and Gracilaria		
h) Pornhyra Laminaria and Sargassum		
c) <i>Laminaria</i> and <i>Gracilaria</i>		
d) <i>Porphyra</i> and <i>Chlamydomonas</i>		
363. <i>Chlamydomonas nivalis</i> is responsible for		
a) Red snow b) Red rust of tea	c) Yellow snow	d) Brown snow
364. The thallus of <i>Volvox</i> is called		-
a) Trichome b) Coenobium	c) Coenocytes	d) Parenchymatous
365. Number of peristomial teeth in moss is		
a) 16 + 16 b) 16 + 32	c) 8 + 16	d) 32 + 32
366. Plants have in their life cycle		
a) Asexual generations only	b) Sexual generations or	hly
c) Alternation of generations	d) Haplontic generations	s only
367. The only living fossil, known by the name of 'maide	n hair tree' is	
a) Thuja b) Pinus	c) Ginkgo	d) Araucaria
368. Chloroplast in <i>Ulothrix</i> is	a) Dibban abarad	d) Cirdle shared
260 · · · · · · · · · · · · · · · · · · ·	cj klobon-snaped	d) Girdle-shaped
A B C D E		
In the diagram given above, the algae have been lab	eled as 'A', 'B', 'C', 'D', and '	E'. These algae are

respectively identified as a) *Dictyota, Polysiphonia, Porphyra, Fucus* and *Laminaria*

h) Pornhyra, Dictyota, L	aminaria, Fucus and Poly	sinhonia				
c) Dictvota, Polysinhon	ia, Pornhvra, Laminaria a	nd Fucus				
d) Fucus Pornhyra Dict	tvota Polysinhonia and Lo	iminaria				
370 The members of brown a	llgae have					
a) Chlorophyll- <i>a</i> , chlorop	hyll- <i>b</i> , xanthophylls	b) Chlorophyll- <i>a</i> , chlorophyll- <i>c</i> , xanthophylls and				
	l ll -	carotenoids				
271 In the protheling of a use	nophyns	a) Chiorophyn-a and xa	anthophyns			
3/1. In the prothanus of a vas	cular cryptogam, the anther	b) There is high degree	at different times. As a result			
a) One can conclude that	the plant is apomistic	d) Solf fortilization is n	rovented			
272 In flowering plants moior	the plant is applinetic	uj sen-lei ulization is p	reventeu			
a) Formation of huds	sis occurs at the time of	h) Cormination of sood				
c) Formation of root prin	nordia	d) Formation of pollen	grains			
373 Which of the following is	an important source of edi	hle protein?	grains			
a) Spirogyrg	h) Pornhyra	c) Sniruling	d) Conhalouros			
374 Floridian starch is reserv	re food in	cj opti attita	uj cepnateur os			
a) Rhodophyceae	b) Phaeophyceae	c) Chlorophyceae	d) Xanthophyceae			
375 Chlamydomonas shows	by i nacophyceae	ej unorophyceue	uj hunchophyceue			
a) Isogamy	b) Anisogamy	c) Both (a) and (b)	d) Oogamy			
376. Mosses are	<i>b</i>) <i>i i i i i i i i i i</i>	c) 20011 (u) unu (b)				
a) Green						
b) Leafy						
c) Upright and radial in s	symmetry					
d) All of the above						
377. The site of photosynthesi	is in blue-green algae is					
a) Chromatophores	b) Mitochondria	c) Chloroplast	d) Root hair			
378. In gymnosperm, the leave	es are well-adapted to with	stand extremes of tempe	erature, humidity and wind.			
What are the xeric charac	cters in conifers?					
a) Needle-like leaves	b) Thick cuticle	c) Sunken stomata	d) All of these			
379. Vegetative reproduction	in <i>Cycas</i> occurs by					
a) Bulbils	b) Sporophylls	c) Fission	d) Scale leaves			
380. Classification done on the	e basis of cytological inform	ation, chromosome stru	cture and their behavior, is			
known as						
a) Molecular classificatio	n	b) Cytotaxonomy				
c) Chemotaxonomy		d) Karyotaxonomy				
381. Choose the correct stater	nents for the sporophyte of	bryophytes,				
I. sporophyte is multicell	ular, not free living but atta	ched to the gametophyte	e for nourishment from it			
II. some cells of the spore	ophyte under go meiosis to	produce haploid spores				
III. these spores germina	te to produce gametophyte					
a) I and II	b) I and III	c) II and III	d) I, II and III			
382. In mosses vegetative rep	roduction takes place by					
a) Fragmentation and bu	dding in the secondary pro	tonema				
b) Gemmae formation an	d endospore formation					
c) Gemmae and tubers fo	ormation					
aj Protonema						
383. Eight nucleated female ga	ametophyte is found in					
a) Bryopnytes	b) Gymnosperms	cj Angiosperms	a) rteriaopnytes			
584. vasculature is poorly dev	eloped, pith has mucilage c	anais, parenchyma and i	neumary rays are abundant			
$\frac{111}{2}$	h) Pinus	c) Salaginalla	d) Europia			
aj cycus	bj r ilius	ς σειαγιτιετία				

385. When a produces two kind of spo	res, the condition is know	vn as				
a) Homospory b) Het	erospory c) Ap	pospory	d) Sporogenesis			
386. Artificial system of classification	was given by					
a) Aristotle b) Lin	naeus c) Th	neophrastus	d) Haeckel			
387. In algae, vegetative reproduction	mainly takes place by	•				
a) Budding b) Aki	netes c) Fr	agmentation	d) Heterocyst			
388. Which of the following plant grou	ip lack true roots, stem an	stem and leaves?				
a) Angiosperms b) Gyr	nnosperms c) Pt	eridophytes	d) Bryophytes			
389. The characteristic of blue-green a	lgae is					
a) DNA without histone	b) Nı	uclear membrane abso	ent			
c) 70 S ribosome	d) All	l of these				
390. Father of Indian Bryology is						
a) Raj Kumar b) S R	Kashyap c) Ma	aheshwari	d) Khurana			
391. In which of the following, pyreno	ids are present?					
a) <i>Marchantia</i> b) <i>Ric</i>	cia c) An	nthoceros	d) All of these			
392. In which of the following feature	s, Cycas resembles with a	ingiosperms?				
a) Presence of vessels	b) Cir	rcinate vernation				
c) Dichotomously branched leave	es d) Po	ollen tube is the carrie	r of male gametes			
393. Megasporophyll is the term used	in gymnosperm to denote	e				
a) Carpel b) Lea	ves c) Fe	emale cone	d) Stamens			
394. Haplo-diplontic life cycle is follow	ved by					
a) Bryophytes and pteridophytes	b) Alg	b) Algae and bryophytes				
c) Angiosperm and gymnosperm	d) Br	d) Bryophytes and gymnosperm				
395. Green alga contains						
a) Chlorophyll- <i>a</i> and <i>b</i> b) Sta	-ch c) Ca	arotenoid	d) All of these			
396. Ectophloic siphonostele is found	in					
a) Adiantum and Cucurbitaceae	b) <i>Os</i>	smunda and Equisetı	ım			
c) Marsilea and Botrychium	d) <i>Di</i>	d) Dicksonia and maiden hair fern				
397. Roots is some gymnospermic ger	era have fungal association	on in the form ofA	. inB Here, A and B			
refers to						
a) A-mycorrhiza; B- <i>Pinus</i>	b) A-	b) A-mycorrniza; B- <i>Lycas</i>				
c) A-lichen; B- <i>Pinus</i>	d) A-	a) A-lichen; B- <i>Lycas</i>				
398. Sphagnum a moss, is used as a p	acking material for transp	orting living material	s because of its			
a) Water holding capacity	b) Cr	b) Creeping capacity				
C) Alkaline nature as it does not i	Indergo decay d) All	l of the above				
399. Which of the following is true ab	but bryopnytes?	a an aontain ablananlar				
a) They are manoid	DJ ID A AU	b) They contain chloroplast				
400 In Spino game	u) Al	I of the above				
400. III <i>Spirogyru</i> ,	inaction occur and homet	hallia				
a) Filaments in which coalariforr	a conjugation occur are notifou	omothallic				
c) Filaments in which lateral con	ingation occur are beterot	thallic				
d) A sexual reproduction occurs	v zoospores	thanic				
401 The protonema is a stage in the li	fe cycle of					
a) <i>Riccia</i> b) <i>Fu</i>	aria c) All	l hrvonhytes	d) <i>Pinus</i>			
402 Identify the alga known for a high	ogical activity called biolu	uminescence	uj i mus			
a) Spiroavra b) Chl	orella c) Cu	vclotella	d) <i>Noctiluca</i>			
403. The moss plant is		, v				
a) Sometimes gametophyte and	sometimes sporophyte					
b) Predominantly gametophyte v	vith sporophyte attached	to it				
, , , , , , , , , , , , , , , , , , ,	1 1 5					

d) Chorenehute				
404 Elagellated male gametes are present in all the three	o of which one of the fall	owing cote?		
404. Flagenated male gametes are present in an the tine	b) Zugnema Samola	owing sets:		
a) Anthoceros, Funaria and Spirogyra	d) <i>Diggia</i> Dryontoria	and Cusas		
405 In brown algae brown colour is due to presence of		anu cycus		
405. In brown algae, brown colour is due to presence of	a) Dhuacamuthuin	d) Chlorophyll		
a) Carolenolus D) Fucoxantinin	c) Phycoerythrin	a) chiorophyli		
400. Nostoc fixes uniti ogen in symbolic association w	ith the following			
I. Altius II. Guiller u				
a) Land II	a) Land III	d) Land IV		
407 The members of Chlorophycese usually have a rigi	d cell wall made up of	uj i allu iv		
a) Cellulose (outer layer) and algin (inner layer)	a cen wan made up or			
h) Pectose (inner layer) and nentidoglycan (outer	aver)			
c) Cellulose (inner layer) and peptidogiyean (otter layer))			
d) Chitin (inner layer) and pectose (outer layer))			
408. Zvgotic meiosis takes place in				
a) <i>Chlamydomonas</i> b) Bryophytes	c) Pinus	d) Drvonteris		
409. Which of the following is correct for <i>Cycas</i> reprodu	iction?			
a) Zooidogamy is followed by siphonogamy	h) Sinhonogamy is followed by zooidogamy			
c) Siphonogamy only	d) Zooidogamy			
410. In <i>Pinus</i> , the third tier of embryonal cells formed b	elow is known as			
a) Rosette tier b) Suspensor tier	c) Embryonal tier	d) Free-nuclear tier		
411. Kingdom-Plantae includes		2		
a) Algae, bryophytes and pteridophytes				
b) Algae, bryophytes, pteridophytes, gymnosperms	and angiosperms			
	U			
c) Algae, fungi, peteridophytes, gymnosperms and	angiosperms			
c) Algae, fungi, peteridophytes, gymnosperms andd) Algae, pteridophytes, gymnosperms and angiosp	angiosperms perms			
 c) Algae, fungi, peteridophytes, gymnosperms and d) Algae, pteridophytes, gymnosperms and angiosp 412. Moss spore germinate to form 	angiosperms perms			
 c) Algae, fungi, peteridophytes, gymnosperms and d) Algae, pteridophytes, gymnosperms and angiosp 412. Moss spore germinate to form a) Sporophyte b) Protonema 	angiosperms perms c) Seta	d) Capsule		
 c) Algae, fungi, peteridophytes, gymnosperms and d) Algae, pteridophytes, gymnosperms and angiosp 412. Moss spore germinate to form a) Sporophyte b) Protonema 413. Pteridophytes mostly occur in 	angiosperms perms c) Seta	d) Capsule		
 c) Algae, fungi, peteridophytes, gymnosperms and d) Algae, pteridophytes, gymnosperms and angiosp 412. Moss spore germinate to form a) Sporophyte b) Protonema 413. Pteridophytes mostly occur in a) Cool, damp and shady places 	angiosperms perms c) Seta	d) Capsule		
 c) Algae, fungi, peteridophytes, gymnosperms and d) Algae, pteridophytes, gymnosperms and angiosp 412. Moss spore germinate to form a) Sporophyte b) Protonema 413. Pteridophytes mostly occur in a) Cool, damp and shady places b) Hot and sunny places 	angiosperms berms c) Seta	d) Capsule		
 c) Algae, fungi, peteridophytes, gymnosperms and d) Algae, pteridophytes, gymnosperms and angiosp 412. Moss spore germinate to form a) Sporophyte b) Protonema 413. Pteridophytes mostly occur in a) Cool, damp and shady places b) Hot and sunny places c) Dry and humid areas 	angiosperms berms c) Seta	d) Capsule		
 c) Algae, fungi, peteridophytes, gymnosperms and d) Algae, pteridophytes, gymnosperms and angiosp 412. Moss spore germinate to form a) Sporophyte b) Protonema 413. Pteridophytes mostly occur in a) Cool, damp and shady places b) Hot and sunny places c) Dry and humid areas d) In water 	angiosperms berms c) Seta	d) Capsule		
 c) Algae, fungi, peteridophytes, gymnosperms and d) Algae, pteridophytes, gymnosperms and angiosperms angiosperms and angiosperms angiosperms and angiosperms and angiosperms ang	angiosperms berms c) Seta ife cycle of	d) Capsule		
 c) Algae, fungi, peteridophytes, gymnosperms and algiosperms and angiosperms angiosperms angiosperms angiosperms angiosperms angiospe	angiosperms berms c) Seta ife cycle of c) <i>Marchantia</i>	d) Capsule d) <i>Laminaria</i>		
 c) Algae, fungi, peteridophytes, gymnosperms and d) Algae, pteridophytes, gymnosperms and angiosperma and angiosperma and angiosperma and angiosperma and angiosperma and angiosperma and sporophyte b) Protonema 412. Moss spore germinate to form a) Sporophyte b) Protonema 413. Pteridophytes mostly occur in a) Cool, damp and shady places b) Hot and sunny places c) Dry and humid areas d) In water 414. Protonema is the juvenile filamentous state in the limit and b) <i>Riccia</i> 415. In which way, mosses affects the quality of soil? 	angiosperms berms c) Seta ife cycle of c) Marchantia	d) Capsule d) Laminaria		
 c) Algae, fungi, peteridophytes, gymnosperms and angiosp 412. Moss spore germinate to form a) Sporophyte b) Protonema 413. Pteridophytes mostly occur in a) Cool, damp and shady places b) Hot and sunny places c) Dry and humid areas d) In water 414. Protonema is the juvenile filamentous state in the limetian of the protonema is the juvenile filamentous state in the limetian of the protonema of the protonema is a prevents soil erosion 	angiosperms berms c) Seta ife cycle of c) <i>Marchantia</i> b) Add nutrients to the	d) Capsule d) <i>Laminaria</i> e soil		
 c) Algae, fungi, peteridophytes, gymnosperms and algiosp d) Algae, pteridophytes, gymnosperms and angiosp 412. Moss spore germinate to form a) Sporophyte b) Protonema 413. Pteridophytes mostly occur in a) Cool, damp and shady places b) Hot and sunny places c) Dry and humid areas d) In water 414. Protonema is the juvenile filamentous state in the I a) Funaria b) Riccia 415. In which way, mosses affects the quality of soil? a) Prevents soil erosion c) Promotes soil degradation 	angiosperms berms c) Seta ife cycle of c) <i>Marchantia</i> b) Add nutrients to the d) They do no affects s	d) Capsule d) <i>Laminaria</i> e soil oil in any way		
 c) Algae, fungi, peteridophytes, gymnosperms and algiosp 412. Moss spore germinate to form a) Sporophyte b) Protonema 413. Pteridophytes mostly occur in a) Cool, damp and shady places b) Hot and sunny places c) Dry and humid areas d) In water 414. Protonema is the juvenile filamentous state in the limit algebra of the state in the limit algebra of the state in the limit algebra of the state of t	angiosperms berms c) Seta ife cycle of c) <i>Marchantia</i> b) Add nutrients to the d) They do no affects s t in the development of se	d) Capsule d) <i>Laminaria</i> e soil oil in any way eed habit?		
 c) Algae, fungi, peteridophytes, gymnosperms and algiosp 412. Moss spore germinate to form a) Sporophyte b) Protonema 413. Pteridophytes mostly occur in a) Cool, damp and shady places b) Hot and sunny places c) Dry and humid areas d) In water 414. Protonema is the juvenile filamentous state in the I a) <i>Funaria</i> b) <i>Riccia</i> 415. In which way, mosses affects the quality of soil? a) Prevents soil erosion c) Promotes soil degradation 416. Which one of the following is considered importantian a) Dependent sporophyte 	angiosperms berms c) Seta ife cycle of c) <i>Marchantia</i> b) Add nutrients to the d) They do no affects s t in the development of se b) Heterospory	d) Capsule d) <i>Laminaria</i> e soil oil in any way eed habit?		
 c) Algae, fungi, peteridophytes, gymnosperms and angiosp 412. Moss spore germinate to form a) Sporophyte b) Protonema 413. Pteridophytes mostly occur in a) Cool, damp and shady places b) Hot and sunny places c) Dry and humid areas d) In water 414. Protonema is the juvenile filamentous state in the limit a) <i>Funaria</i> b) <i>Riccia</i> 415. In which way, mosses affects the quality of soil? a) Prevents soil erosion c) Promotes soil degradation 416. Which one of the following is considered importantian a) Dependent sporophyte c) Haplontic life cycle 	angiosperms berms c) Seta ife cycle of c) <i>Marchantia</i> b) Add nutrients to the d) They do no affects s t in the development of se b) Heterospory d) Free-living gametop	d) Capsule d) <i>Laminaria</i> e soil oil in any way eed habit? bhyte		
 c) Algae, fungi, peteridophytes, gymnosperms and angiosp 412. Moss spore germinate to form a) Sporophyte b) Protonema 413. Pteridophytes mostly occur in a) Cool, damp and shady places b) Hot and sunny places c) Dry and humid areas d) In water 414. Protonema is the juvenile filamentous state in the I a) <i>Funaria</i> b) <i>Riccia</i> 415. In which way, mosses affects the quality of soil? a) Prevents soil erosion c) Promotes soil degradation 416. Which one of the following is considered importan a) Dependent sporophyte c) Haplontic life cycle 417. In capsule of moss, shock absorbers are 	angiosperms berms c) Seta ife cycle of c) <i>Marchantia</i> b) Add nutrients to the d) They do no affects s t in the development of se b) Heterospory d) Free-living gametop	d) Capsule d) <i>Laminaria</i> e soil oil in any way eed habit? bhyte		
 c) Algae, fungi, peteridophytes, gymnosperms and angiosp 412. Moss spore germinate to form a) Sporophyte b) Protonema 413. Pteridophytes mostly occur in a) Cool, damp and shady places b) Hot and sunny places c) Dry and humid areas d) In water 414. Protonema is the juvenile filamentous state in the I a) <i>Funaria</i> b) <i>Riccia</i> 415. In which way, mosses affects the quality of soil? a) Prevents soil erosion c) Promotes soil degradation 416. Which one of the following is considered importan a) Dependent sporophyte c) Haplontic life cycle 417. In capsule of moss, shock absorbers are a) Trabeculae b) Peristome teeth 	angiosperms berms c) Seta ife cycle of c) <i>Marchantia</i> b) Add nutrients to the d) They do no affects s t in the development of se b) Heterospory d) Free-living gametop c) Seta	d) Capsule d) <i>Laminaria</i> e soil oil in any way eed habit? bhyte d) Annulus		
 c) Algae, fungi, peteridophytes, gymnosperms and d) Algae, pteridophytes, gymnosperms and angiosp 412. Moss spore germinate to form a) Sporophyte b) Protonema 413. Pteridophytes mostly occur in a) Cool, damp and shady places b) Hot and sunny places c) Dry and humid areas d) In water 414. Protonema is the juvenile filamentous state in the I a) Funaria b) Riccia 415. In which way, mosses affects the quality of soil? a) Prevents soil erosion c) Promotes soil degradation 416. Which one of the following is considered importan a) Dependent sporophyte c) Haplontic life cycle 417. In capsule of moss, shock absorbers are a) Trabeculae b) Peristome teeth 	angiosperms berms c) Seta ife cycle of c) <i>Marchantia</i> b) Add nutrients to the d) They do no affects s t in the development of se b) Heterospory d) Free-living gametop c) Seta	d) Capsule d) <i>Laminaria</i> e soil oil in any way eed habit? bhyte d) Annulus		
 c) Algae, fungi, peteridophytes, gymnosperms and d) Algae, pteridophytes, gymnosperms and angiosp 412. Moss spore germinate to form a) Sporophyte b) Protonema 413. Pteridophytes mostly occur in a) Cool, damp and shady places b) Hot and sunny places c) Dry and humid areas d) In water 414. Protonema is the juvenile filamentous state in the I a) Funaria b) Riccia 415. In which way, mosses affects the quality of soil? a) Prevents soil erosion c) Promotes soil degradation 416. Which one of the following is considered importan a) Dependent sporophyte c) Haplontic life cycle 417. In capsule of moss, shock absorbers are a) Trabeculae b) Peristome teeth 418. Haploid structure of Funaria is a) Calyptra b) Protonema 	angiosperms berms c) Seta ife cycle of c) <i>Marchantia</i> b) Add nutrients to the d) They do no affects s t in the development of se b) Heterospory d) Free-living gametop c) Seta c) Apophysis	d) Capsule d) <i>Laminaria</i> e soil oil in any way eed habit? ohyte d) Annulus d) Operculum		
 c) Algae, fungi, peteridophytes, gymnosperms and d) Algae, pteridophytes, gymnosperms and angiosp 412. Moss spore germinate to form a) Sporophyte b) Protonema 413. Pteridophytes mostly occur in a) Cool, damp and shady places b) Hot and sunny places c) Dry and humid areas d) In water 414. Protonema is the juvenile filamentous state in the I a) Funaria b) Riccia 415. In which way, mosses affects the quality of soil? a) Prevents soil erosion c) Promotes soil degradation 416. Which one of the following is considered importan a) Dependent sporophyte c) Haplontic life cycle 417. In capsule of moss, shock absorbers are a) Trabeculae b) Peristome teeth 418. Haploid structure of Funaria is a) Calyptra b) Protonema 	angiosperms berms c) Seta ife cycle of c) <i>Marchantia</i> b) Add nutrients to the d) They do no affects s t in the development of se b) Heterospory d) Free-living gametop c) Seta c) Apophysis sporophytic stage in plan	d) Capsule d) <i>Laminaria</i> e soil oil in any way eed habit? ohyte d) Annulus d) Operculum t life cycle?		
 c) Algae, fungi, peteridophytes, gymnosperms and d) Algae, pteridophytes, gymnosperms and angiosp 412. Moss spore germinate to form a) Sporophyte b) Protonema 413. Pteridophytes mostly occur in a) Cool, damp and shady places b) Hot and sunny places c) Dry and humid areas d) In water 414. Protonema is the juvenile filamentous state in the I a) Funaria b) Riccia 415. In which way, mosses affects the quality of soil? a) Prevents soil erosion c) Promotes soil degradation 416. Which one of the following is considered importan a) Dependent sporophyte c) Haplontic life cycle 417. In capsule of moss, shock absorbers are a) Trabeculae b) Peristome teeth 418. Haploid structure of Funaria is a) Calyptra b) Protonema 419. Which of the following statement is true about the a) The haploid generation 	angiosperms berms c) Seta ife cycle of c) <i>Marchantia</i> b) Add nutrients to the d) They do no affects s t in the development of se b) Heterospory d) Free-living gametop c) Seta c) Seta c) Apophysis sporophytic stage in plan	d) Capsule d) <i>Laminaria</i> e soil oil in any way eed habit? ohyte d) Annulus d) Operculum t life cycle?		

c) Generation that p	oduces the spores					
d) Generation that p	oduces vascular					
420. Phylogenetic system	of classification is also know	wn as				
a) Artificial system o	f classification	b) Hutchinson's system	m of classification			
c) Natural system of	classification	d) Whittaker system o	of classification			
421. Transfusion tissue is	present in the leaves of)				
a) Dryopteris	b) Cycas	c) Pinus	d) Both (b) and (c)			
422. Gametophytic genera	ation is dominant stage in th	ne life cycle of				
a) Pteridophytes	b) Angiosperms	c) Gymnosperms	d) Bryophytes			
423. Pyrenoids are made	up of					
a) Core of starch sur	rounded by sheath of prote	in				
b) Core of protein su	rrounded by fatty sheath					
c) Proteinaceous cen	tre and starchy sheath	.)				
d) Core of nucleic aci	d surrounded by protein sh	ieath				
424. In ferns and mosses,	movement of antherozoids	towards female component	t is called			
a) Phototaxis	b) Chemotaxis	c) Hydrotropism	d) Thigmotropism			
425. Atleast a half of the t	otal CO_2 fixation on earth is	carried out byA throug	nB Here A and B refers to			
a) A-bryopnytes, B-r	espiration					
b) A-algae, B-photosy	/ntnesis					
c) A-pteridophytes, I	3-photosynthesis					
a) A-fungi, B-respirat	tion					
426. Consider the following	ig statements regarding rep	broduction in class-Unioropy	yceae.			
I. Asexual reproducti	on is mainly by flagellated 2	zoospores produced in zoos	porangia.			
II. The sexual reprod	uction snows considerable	variation in the type and for	rmation of sex cells and it may			
be isogamous, anisog	amous and oogamous.	• 1				
which of the stateme	ents given above are correct					
a) Only I	b) Unly II	c) I and II	a) None of these			
427. Laminarin and manit	col of class-Phaeophyceae (I	b) Consultation and a bood				
a) Proteins		d) Fort	d) Fot			
C) Lipoproteins	atomonto.	d) Fat				
428. Choose the correct st	atements.	alo in Anonhusis is the en	ical stavils part of the			
a)	asai iertile part of the capsi	b)				
c) Apospory is the de	volopmont of sporophyto f	rom d) Anogamy is the day	cycus			
vogetative cells of	the gametonbyte	from vegetative cel	ls of the sporophyte			
420 The first Division w	hich comes under kingdom	Diantao is	is of the sporophyte			
	h) Fungi	c) Cuanobactoria	d) Blue-green algae			
420 Microsporangia in g	DJ Fuligi	CJ Cyanobacteria	u) blue-gi een algae			
450. Microsporaligia III gy	tion of microsporophyll					
a) On the lowerside	f microsporophyll					
c) On the middle per	tion of magaznaranhull					
d) At the extreme tin	of microsporophyll					
421 Spore of Euroria on	germination produces					
a) Protonoma	b) Anthoridia	c) Archagonia	d) Vogotativo body			
432 Eusion of two gamet	b) Anthe inta	ize is termed as	u) vegetative body			
-452. Pusion of two gamete	b) Isogamy	c) Anisogamy	d) Zoogamy			
433 Heterosporous ntori	donhytes always produce	cj milisogailly	uj 200ganiy			
a) Monoecious game	tonhytes	h) Directous gameton	hytes			
c) Homothallic game	tonhytes	d) None of the above	11y (C)			
434 Poonla recovering fr	m long illness are often ad	vised to include the alga Sm	<i>iruling</i> in their diet because it			
	and one miless are oncen au	viscu to include the alga Spl	and the manent and Decause It			

a) Makes the food easy to digest	b) Is rich in proteins	b) Is rich in proteins					
c) Has antibiotic properties	d) Restores the intes	d) Restores the intestinal microflora					
435. A ring of multiciliate zoogonidium is found in							
a) Ulothrix b) Zygnema	c) Oedogonium	d) Chara					
436. Sterile part of <i>Cycas</i> microsporophyll is							
a) Apophysis b) Sporophore	c) Middle part	d) Lower part					
437. Which of the following is living fossil?							
a) Gnetum b) Cycas	c) Ginkgo	d) Both (b) and (c)					
438. Read carefully the following statements about an	ngiospermic sexual fertilis	ation					
I. Pollen tube carries the male gamete towards a	rchegonia and discharge o	contents in the mouth of					
archegonium							
II. Male gamete fuses with egg to give rise zygote	e						
III. Zygote develops into embryo and embryo int	to seeds						
IV. Seeds are naked							
Which of the statement given above are correct?							
a) I and II b) I, III and IV	c) I, II and IV	d) I, II, III and IV					
439. Which type of moss is <i>Funaria</i> ?							
a) Acrocarpous moss	b) Pleurocarpous mo	OSS					
c) Anacrogynous moss	d) Cleistocarpous m	OSS					
440. Select the correctly matched ones.							
I. Phaeophyceae - Mannitol							
II. Rhodophyceae - Dictyota							
III. Chlorophyceae - Non-motile gametes							
IV. Rhodophyceae - <i>r</i> -phycoerythrin							
a) I, II and III b) II, III and IV	c) I and III	d) I and IV					
441. Algae have cell wall made up of							
a) Cellulose, galactans and mannans	b) Hemicelluloses, p	ectins and proteins					
c) Pectins, cellulose and proteins	d) Cellulose, hemicelluloses and pectins						
442. Pyrenoids are present in the in most of the gr	reen algae						
a) Chloroplast b) Ribosome	c) Plastids	d) Chromoplast					
443. Indusium is found in							
a) Algae b) Ferns	c) Moss	d) Cycas					
444. External fertilization occurs in majority of							
a) Algae b) Fungi	c) Liverworts	d) Mosses					
445. In the life cycle of mosses, the gametophyte has	two stages (A and B). The	se stages can be called					
a) A-Protonema; B-Leafy stage	b) A-Protonema; B-S	Sporogonium					
c) A-Sporophyte; B-Gametophyte	d) A-Zygote; B-S	Spore mother cell					
446. Number of meiosis for formation of 64 zygotes in	n angiosperm is 80 but in	gymnosperms number of					
meiosis for formation of 64 zygotes will							
a) 40 b) 80	c) 160	d) 20					
447. In gymnosperm the microspores develop into a	male gametophyte genera	tion which					
a) Is highly reduced and confined to only a limite	ed number of cells						
b) Is highly developed							
c) Has an independent life							
d) Both (a) and (c)							
448. In a monoecious plant							
a) Male and female sex organs are on different in	ndividuals						
b) Male and female gametes are of two morphole							
	ogically distinct types						
c) Male and female sex organs are on the same in	ogically distinct types ndividual						

 a) Chara, Fucus, Polysiphonia b) Volvox, Spirog yra, Chlamydomonas d) Sargassum, Laminaria, Gracillaria 450. Which of the following is incorrect with respect to angiosperms? a) Endosperm - Triploid b) Megaspore - Diploid c) Pollen grain - Haploid d) Synergid - Haploid d) Synergid - Haploid d) Synergid - Haploid folden being sandwitched between xylem b) Carmbium present in between xylem and phloem c) Xylem being sandwitched between phloem d) Xylem and phloem occurring on different radii 452. Which green alga shows beterotrichous habit and may have given rise to terrestrial (land) habit? a) Charmydomona b) Fritschiella c) Vaucheria d) Ulothrix 453. The characteristic features of bryophytes are I. main plant body is gametophytic H. reding and mometric for fertilisation Which of the statements given above are correct? a) I and II b) I and II c) Ginkgo d) Red wood tree Sique and non-motile 455. Anisoganous means both gamete are a) Similar in size and non-motile b) Sissimilar in size and non-motile c) Ginkgo d) Moraing c) Simple and holdfast c) Ginkgo birow algae is differentiated into a) Bioldfast and frond b) Sissimilar in size and non-motile d) Characteristic of term is d) Moraing b) Biasccate c) Singe and holdfast c) Fordine shape shape covering of sorus in Dryopteris, is called d) Placentia b) Bamentum c) Senporhylid	449. In which of the following, all listed genera belong t	to the same class of algae?				
 c) Porphyra, Ectocarpus, Ulothrix d) Sargassum, Laminaria, Gracillaria 450. Which of the following is incorrect with respect to angiosperms? a) Endosperm - Triploid d) Negaspore - Diploid d) Synergid - Haploid d) Ulothrix 452. Which set and phoem occurring on different radii h) Hand III d) Synergid - Haploid d) And Haploid d) Haddiat and from - motile d) Synergid - Haploid <lid) -<="" synergid="" td=""><td>a) Chara, Fucus, Polysiphonia</td><td colspan="5">b) Volvox, Spirogyra, Chlamydomonas</td></lid)>	a) Chara, Fucus, Polysiphonia	b) Volvox, Spirogyra, Chlamydomonas				
 450. Which of the following is incorrect with respect to angiosperns? a) Endospern - Triploid b) Megaspore - Diploid c) Police grain - Haploid d) Synergid - Haploid 451. In <i>Cycas</i> stem, open vascular bundle is characterized by a) Phoem being sandwitched between ylem b) Cambium present in between sylem and phloem d) Xylem and phloem occurring on different radii 452. Which green alga shows heterotrichous habit and may have given rise to terrestrial (land) habit? a) <i>Chamydomonas</i> b) <i>Fritschiella</i> c) <i>Vaucheria</i> d) <i>Ulothrix</i> 453. The characteristic features of bryophytes are I. main plant body is gametophytic III. requirement of water for fertilisation Which of the statements given above are correct? a) I and II b) I and III c) I and III d) Red wood tree Siquoia 454. Which is the tallest gymnospermic tree species? a) <i>Clinkgo</i> d) Red wood tree Siquoia 455. Anisogamous means both gamete are a) Similar in size and non-motile b) <i>Cycas</i> c) <i>Clinkgo</i> d) Holdfast, stipe and holdfast e) Frond and stripe d) Holdfast, stipe and holdfast e) Frond and stripe d) Morning c) Similar in size and non-motile b) Rementum c) Sporphyll d) Nona 456. Usually plant body of sorus in <i>Dryopterts</i>, is called a) Planestandorman b) Basenate c) Similar in size and non-motile b) Rementum c) Sporphyll d) Nona 457. He kidney-shaped covering of sorus in <i>Dryopterts</i>, is called a) Placenta b) Basentare c) Similar in size and non-motile c) Sporphyll d) Nona c) Stripe and holdfast d	c) Porphyra, Ectocarpus, Ulothrix	d) Sargassum, Laminaria, Gracillaria				
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a) Chlorophyll- <i>b</i> b) Xanthophyll c) <i>c</i> phycocyanin d) Fucoxanthin	466. Blue-green algae has					
	a) Chlorophyll- <i>b</i> b) Xanthophyll	c) <i>c</i> phycocyanin	d) Fucoxanthin			

 467. Which type of the rhizolds are present in <i>Riccia?</i> a) Unicellular smooth c) Unicellular smooth and tuberculated 468. Identify the alga, which exhibits diplontic life cycle. a) <i>Spirogyra</i> b) <i>Chlamydomonas</i> 469. Gymnosperms are a) Flowering plants b) Seed bearing plants c) Seedless flowering plants 	 b) Multicellular smooth d) Multicellular smooth c) <i>Fucus</i> 	n and tuberculated d) <i>Volvox</i>
d) Fruit bearing plants		
470. Which of the following plant does not have Rhizobia	um containing root nodu	les?
a) Phaseolus b) Pinus	c) Pisum	d) Cicer
471. The diagram represents the life cycle of angiosperm	. Choose the correct com	bination of labelling
Sporophyte Embryo Zygole Sporophyte Embryo Sporophyte Embryo Sporophyte Embryo Sporophyte Sporophyte Embryo Sporophyte Sporophyte Embryo Sporophyte Sporophyte Sporophyte Carries Sporophyte Sporophyt		
a) A-Anther, B-Stigma, C-egg, D-Male gametophyte,	E-ovule	
b) A-Ovule, B-Stigma, C- Male gametophyte, D- Anth	er, E-Egg	
c) A-Male gametophyte, B-Stigma, C-Anther, D-Egg,	E-ovule	
d) A-Stigma, B- Anther, C- Male gametophyte, D-Egg	, E-ovule	
472. Plants of this group are diploid and well adapted to	extreme conditions. They	grow bearing sporophylls in
compact structures called cones. The group in refere	ence is	
a) Monocots b) Dicot	c) Angiosperms	d) Gymnosperms
473. After fertilisation the ovules develop into		
a) Fruit b) Seed coats	CJ Seed	d) Integuments
a) <i>Voluev</i> b) <i>Chara</i>	lowing algae exhibits dip	
a = V U V U X $b = U = U = U = U = U = U = U = U = U =$	c) Volucinhonia	d) Focus
475 Which one of the following plants functions as symb	c) <i>Polysiphonia</i> olic nitrogen-fixing plan	d) <i>Focus</i>
475. Which one of the following plants functions as symbols a) <i>Azolla</i> b) <i>Cycas</i>	 c) Polysiphonia olic nitrogen-fixing plan c) Moss 	d) <i>Focus</i> t? d) <i>Marchantia</i>
 475. Which one of the following plants functions as symbols a) <i>Azolla</i> b) <i>Cycas</i> 476. Which of the following is autotrophic? 	 c) <i>Polysiphonia</i> olic nitrogen-fixing plan c) Moss 	d) Focus t? d) Marchantia
 475. Which one of the following plants functions as symbols a) <i>Azolla</i> b) <i>Cycas</i> 476. Which of the following is autotrophic? a) Virus b) Mycoplasma 	 c) <i>Polysiphonia</i> olic nitrogen-fixing plan c) Moss c) <i>Nostoc</i> 	d) <i>Focus</i> t? d) <i>Marchantia</i> d) All of these
 475. Which one of the following plants functions as symbols a) <i>Azolla</i> b) <i>Cycas</i> 476. Which of the following is autotrophic? a) Virus b) Mycoplasma 477. In some pteridophytes, sporophyll form distinct complexity 	 c) <i>Polysiphonia</i> olic nitrogen-fixing plant c) Moss c) <i>Nostoc</i> apact structures called 	d) <i>Focus</i> t? d) <i>Marchantia</i> d) All of these A inB andC Here A,
 475. Which one of the following plants functions as symbols a) <i>Azolla</i> b) <i>Cycas</i> 476. Which of the following is autotrophic? a) Virus b) Mycoplasma 477. In some pteridophytes, sporophyll form distinct com B and C refers to 	 c) <i>Polysiphonia</i> olic nitrogen-fixing plan c) Moss c) <i>Nostoc</i> npact structures called 	d) <i>Focus</i> t? d) <i>Marchantia</i> d) All of these A inB andC Here A,
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 475. Which one of the following plants functions as symbols a) <i>Azolla</i> b) <i>Cycas</i> 476. Which of the following is autotrophic? a) Virus b) Mycoplasma 477. In some pteridophytes, sporophyll form distinct com B and C refers to a) A-sporocarp, B-<i>Pogonatum</i>, C-<i>Selaginella</i> b) A-spikelet, B-<i>Riccia</i>, C-<i>Marchentia</i> c) A-strobilus, B-<i>Selaginella</i>, C-<i>Equisetum</i> d) A-spike, B-<i>Fern</i>, C-<i>Salvinia</i> 478. <i>Kelp</i> (branched form) and <i>Sargassam</i> (filamentous a) Green algae b) Brown algae 479. In <i>Chlamydomonas</i>, the meiosis occurs in 	c) <i>Polysiphonia</i> olic nitrogen-fixing plan c) Moss c) <i>Nostoc</i> npact structures called s form) belongs to c) Red algae	d) <i>Focus</i> d) <i>Marchantia</i> d) All of these A inB andC Here A, d) Blue-green algae
 475. Which one of the following plants functions as symbols a) <i>Azolla</i> b) <i>Cycas</i> 476. Which of the following is autotrophic? a) Virus b) Mycoplasma 477. In some pteridophytes, sporophyll form distinct comes and C refers to a) A-sporocarp, B-<i>Pogonatum</i>, C-<i>Selaginella</i> b) A-spikelet, B-<i>Riccia</i>, C-<i>Marchentia</i> c) A-strobilus, B-<i>Selaginella</i>, C-<i>Equisetum</i> d) A-spike, B-<i>Fern</i>, C-<i>Salvinia</i> 478. <i>Kelp</i> (branched form) and <i>Sargassam</i> (filamentous a) Green algae b) Brown algae 479. In <i>Chlamydomonas</i>, the meiosis occurs in a) Gamete b) Zygote 	 c) <i>Polysiphonia</i> olic nitrogen-fixing plan c) Moss c) <i>Nostoc</i> npact structures called s form) belongs to c) Red algae c) Sporogonium 	d) <i>Focus</i> d) <i>Marchantia</i> d) All of these A inB andC Here A, d) Blue-green algae d) Zoospore

480. Consider the following statements I. The plants have magnificent property of retaining more than their own weight. Hence, they are wide	ng water. They can with he	old water two hundred times									
during transportation and propagation	ery used by gardeners to k	eep cut plant parts moist									
II. These plants grow as semiaquatic or submerge	II. These plants grow as semiaquatic or submerged in acidic marshes. The older portions of plant die but										
do not decay due to peculiar germicidal propertie	s	fuer portions of plant are but									
The above statements belongs to which of the foll	owing bryophitic plant?										
a) <i>Pogonatum</i> b) <i>Funaria</i>	c) <i>Sphagnum</i>	d) <i>Marchantia</i>									
481. First vascular plant is											
a) Thallophyta b) Bryophyta	c) Pteridophyta	d) Spermatophyta									
482. Female cone of <i>Pinus</i> is a											
a) Modified needles b) Modified long shoot	c) Modified dwarf sho	oot d) Modified scale									
483. Algae include unicellular forms likeA, filamen	tous likeB and colonic	al forms likeC Here A, B									
and C refer to											
a) A- <i>Chlamydomonas</i> , B- <i>Volvox</i> , C- <i>Ulothrix</i>											
b) A- <i>Ulothrix,</i> B- <i>Volvox</i> , C- <i>Chlamydomonas</i>											
c) A- <i>Volvox</i> , B- <i>Ulothrix</i> , C- <i>Chlamydomonas</i>											
d) A- <i>Chlamydomonas</i> , B- <i>Ulothrix</i> , C- <i>Volvox</i>											
484. The gametophyte of moss is											
a) Seta b) Capsule	c) Zygote	d) Protonema									
485. In gymnosperms, the ovule is naked because											
a) Ovary wall is absent	b) Integuments are ab	osent									
c) Perianth is absent	d) Nucellus is absent										
486. Which of the following is not correctly matched?											
a) <i>Chlamydomonas</i> - Unicellular flagellated	b) Laminaria - Flatte	ned leaf-like thallus									
c) <i>Chlorella</i> - Unicellular non-flagellated	d) Volvox - Colonial	u) <i>v otvox</i> - Coloniai Iorin, non-nagenateu									
487. Consider the following statements	monous ntoridon hutos the	t ava lanta an avan ciata									
I. Hydropterides are only plant among the neteros	sporous pieridophyles that	it are leptosporangiate									
III. The difference in size between microspore and	d mogasnore in S <i>eleginell</i>	a kraussiana is 1.200									
IV Female gametonbyte of <i>Seleginella</i> mostly ba	ve single archenogium	u Krausstana 15 1.200									
Which of the above statement are correct?	ve single arenenogram										
a) I and II b) IV	c) L II and IV	d) L. IL. III and IV									
488. Male sex organs in an angiospermic flower is	oj 1, 11 ana 11										
a) Stamen b) Pistil	c) Carpel	d) Shoot									
489. Which of the following is an algal parasite?	J - F	.,									
a) Volvox b) Ulothrix	c) Porphyra	d) Cephaleuros									
490. Mannitol is the stored food in											
a) Chara b) Porphyra	c) Fucus	d) Gracillaria									
491. Select the correct sequential arrangement of repr	oductive structures for pto	eridophytes									
a) Sporophyll → Strobilli → Sporangia → Spore m	other cell \rightarrow Spores										
b) Strobilli \rightarrow Sporophyll \rightarrow Sporangia \rightarrow Spores											
c) Spores \rightarrow Sporophyll \rightarrow Sporangia \rightarrow Strobili											
d) Spores \rightarrow Sporangia \rightarrow Sporophyll \rightarrow Strobili											
492. In gymnosperms, the seeds are naked because the	ey lack										
a) Integument b) Nucellus	c) Pericarp	d) Perianth									
493. The relationship between the alga <i>Microcystis</i> and	nd the surrounding fauna o	corresponds to									
a) Ammensalism b) Parasitism	c) Predation	d) Exploitation									
494. Bryophytes resemble algae in the following aspec	t.										
aJ Filamentous body, presence of vascular tissues	and autotrophic nutrition	1									

b) Differentiation of plant body into root, stem an	d leaves and autotrophic nut	rition
c) Thallus like plant body, presence of roots and a	iutotrophic nutrition	
d) Thallus like plant body, lack of vascular tissues	and autotrophic nutrition	
495. Algae are also found in association with		
a) Fungi b) Lichen	c) Sloth bear	d) Both (a) and (c)
496. The bryophytes are divided into		
a) Mosses and liverworts	b) Ferns and liverworts	
c) Mosses and horse tails	d) Ferns and horse tails	
497. Consider the following statements		
I. In red algae vegetative reproduction takes place	by fragmentation	
II. In red algae the food is stored as floridean star	ch, which is very similar to a	mylopectin and glycogen is
structure		
III. Cell wall of red algae consists of chitin		
Which of the statements given above are correct?		
a) I and II b) I and III	c) II and III	d) All of these
498. In <i>Selaginella</i> , trabeculae are the modification of		
a) Epidermal cells b) Cortical cells	c) Endodermal cells	d) Pericycle cells
499. Which one of the following formed in <i>Spirogyra</i> i	is different based on its nucle	eus?
a) Zygospore b) Azygospore	c) Aplanospore	d) Akinete
500. During development of embryo in archegonium o	f Bryophyta, its posterior pa	rt form protective embryo
cover, which is called		
a) Calyptra b) Paraphysis	c) Apophysis	d) Hypophysis
501. Ectocarpus, Dictyota, Laminaria, Sargassum ar	nd <i>Fucus</i> belongs to the class	5
a) Phaeophyceae b) Rhodophyceae	c) Chlorophyceae	d) Cynophyceae
502. Sexual reproduction in <i>Spirogyra</i> is an advanced	feature because it shows	
a) Morphologically differentiated sex organs	b) Physiologically different	entiated sex organs
c) Different sizes of motile sex organs	d) Same size of motile se	ex organs
503. Buxbaumia aphylla is a classical example of		
a) Parasitic bryophyte	b) Saprophytic bryophyt	te
c) Symbiotic bryophyte	d) Nitrogen fixing form	
504. Identify the given figures of algae and select the co	orrect option	
Air bladder Frond Midrib Holdfast		
Frond Frond		
C D		
a) A- <i>Volvox</i> , B- <i>Chlamydomonas</i> , C- <i>Chara</i> , D-	b) A- <i>Fucus</i> , B- <i>Polysiphc</i>	onia, C- <i>Porphyra,</i> D- <i>Dictyota</i>
Porphyra		
c) A- <i>Fucus</i> , B- <i>Dictyota,</i> , C- <i>Porphyra</i> , D- <i>Polysipho</i>	<i>nia</i> d) A- <i>Dictyota,</i> B- <i>Porphy</i>	<i>rra,</i> C- <i>Fucus</i> , D- <i>Polysiphonia</i>
505. Mosses and ferns are found in moist and shady pl	aces because both	
a) Require presence of water for fertilization	b) Do not need sunlight	for photosynthesis
c) Depend for their nutrition on microorganisms,	d) Cannot compete with	sun-loving plants
which can survive only at low temperature		
506. Elater mechanism or spore dispersal is exhibited	by	
a) Riccia b) Funaria	c) Liverworts	d) Marchantia

507. Which of the following ca	n be regarded as seedless v	vascular plants?				
a) Angiosperms	b) Gymnosperms	c) Bryophytes	d) Pteridophytes			
508. Fern gametophyte shows	nature.					
a) Homothallic	b) Fragmentation	c) Heterothallic	d) None of these			
509. The peculiar feature of M	archantia palmata is					
a) Absence of gemma cup)	b) Presence of androgyno	ous receptacles			
c) Absence of eaters		d) All of the above				
510. Chlorophyll-a, chlorophy	ll-d and phycoerythrin are	characteristics of class				
a) Phaeophyceae	b) Xanthophyceae	c) Chlorophyceae	d) Rhodophyceae			
511. Ramenta is the characteri	istic of					
a) Marchantia	b) <i>Funaria</i>	c) Dryopteris	d) None of these			
512. Sperm of <i>Cycas</i> is						
a) Multiflagellated and ve	ery large	b) Small and biflagellated				
c) Multiflagellated and sn	nall	d) Large and biflagellated	l			
513. Archegoniophore is prese	ent in					
a) <i>Chara</i>	b) Adiantum	c) Funaria	d) Marchantia			
514. In <i>Pinus</i> , male cone bears	s a large number of					
a) Ligules	b) Anthers	c) Microsporophylls	d) Megasporophylls			
515. Which one pair of example	les will correctly represent	the grouping spermatophy	rta according to one of the			
schemes of classifying pla	ants?					
a) Rhizopus,Triticum	b) Ginkgo, Pisum	c) Acacia, Sugarcane	d) Pius, Cycas			
516. Read carefully the followi	ing statements about pterio	lophytes				
I. They are called vascular	r cryptogams					
II. They produce spores ra	ather than seeds					
IIII. They are used for me	dicinal purposes					
IV. They are used as soil b	oinders					
V. They are frequently gro	own as ornaments					
Which of the statements ۽	given above are correct?					
a) I, II and V	b) II, IV and V	c) II, III, IV and V	d) I, II, III, IV and V			
517. Corolloid roots are found	in					
a) Bryophytes	b) Pteridophytes	c) Gymnosperms	d) Angiosperms			
518. Leaf in young condition in	n fern is called					
a) Scale leaf	b) Sporophyll	c) Circinate ptyxis	d) None of these			

NEET BIOLOGY

PLANT KINGDOM

	: ANSWER KEY :													
1)	а	21	а	3)	Ь	4)	h	157)	Ь	158)	ſ	159)	Ь	160) h
1) 5)	a h	2) 6)	a	5) 7)	u C	4) 8)	a	161)	u h	162)	c c	163)	u C	160) b
9)	b	0) 10)	a	11)	a	12)	b	165)	d	166)	a	167)	d	161) e
13)	h	14)	h	15)	a	16)	d	169)	h	170)	a	171)	h	100) u 172) h
17)	a	18)	c	19)	a	20)	b	173)	a	174)	C	175)	d	17 -) 5
21)	a	22)	С	23)	b	_*) 24)	c	177)	d	178)	d	179)	а	180) b
25)	d	26)	a	27)	d	28)	b	181)	c	182)	d	183)	a	184) a
29)	b	30)	b	31)	a	32)	d	185)	b	186)	d	187)	С	188) a
33)	b	34)	b	35)	d	36)	b	189)	d	190)	d	191)	d	192) c
37)	d	38)	а	39)	b	40)	а	193)	а	194)	с	195)	а	196) c
41)	d	42)	С	43)	b	44)	d	197)	d	198)	а	, 199)	b	200) a
45)	d	46)	а	47)	С	48)	с	201)	b	202)	b	203)	d	204) b
49)	а	50)	d	51)	d	52)	с	205)	b	206)	а	207)	С	208) b
53)	b	54)	а	55)	b	56)	с	209)	а	210)	b	211)	b	212) a
57)	а	58)	а	59)	b	60)	а	213)	d	214)	а	215)	b	216) c
61)	b	62)	С	63)	b	64)	d	217)	С	218)	d	219)	а	220) c
65)	с	66)	d	67)	b	68)	b	221)	а	222)	с	223)	d	224) a
69)	b	70)	а	71)	b	72)	а	225)	d	226)	b	227)	С	228) d
73)	b	74)	С	75)	С	76)	d	229)	b	230)	с	231)	С	232) d
77)	с	78)	d	79)	а	80)	с	233)	а	234)	с	235)	а	236) b
81)	d	82)	b	83)	d	84)	b	237)	d	238)	b	239)	С	240) a
85)	С	86)	а	87)	b	88)	d	241)	d	242)	а	243)	С	244) b
89)	d	90)	d	91)	b	92)	а	245)	d	246)	b	247)	С	248) c
93)	а	94)	d	95)	С	96)	b	249)	b	250)	d	251)	С	252) d
97)	b	98)	b	99)	а	100)	с	253)	а	254)	С	255)	d	256) d
101)	С	102)	d	103)	а	104)	b	257)	d	258)	а	259)	а	260) c
105)	а	106)	а	107)	d	108)	а	261)	а	262)	а	263)	b	264) a
109)	С	110)	С	111)	d	112)	С	265)	С	266)	а	267)	С	268) a
113)	b	114)	С	115)	d	116)	b	269)	b	270)	b	271)	С	272) b
117)	а	118)	а	119)	С	120)	С	273)	а	274)	а	275)	а	276) a
121)	а	122)	а	123)	d	124)	b	277)	а	278)	b	279)	b	280) b
125)	а	126)	С	127)	С	128)	а	281)	а	282)	С	283)	d	284) a
129)	С	130)	а	131)	a	132)	С	285)	b	286)	b	287)	d	288) c
133)	а	134)	С	135)	b	136)	а	289)	d	290)	b	291)	d	292) b
137)	b	138)	а	139)	С	140)	b	293)	а	294)	С	295)	а	296) a
141)	а	142)	С	143)	С	144)	a	297)	d	298)	С	299)	а	300) d
145)	d	146)	b	147)	а	148)	a	301)	С	302)	b	303)	b	304) c
149)	d	150)	С	151)	d	152)	С	305)	С	306)	С	307)	С	308) a
153)	а	154)	а	155)	d	156)	d	309)	С	310)	а	311)	d	312) c
							•							Page 36

313)	b	314)	с	315)	С	316)	b	421)	d	422)	d	423)	С	424)	b
317)	b	318)	а	319)	d	320)	a	425)	b	426)	С	427)	b	428)	b
321)	d	322)	а	323)	d	324)	с	429)	а	430)	d	431)	а	432)	С
325)	d	326)	b	327)	С	328)	b	433)	b	434)	b	435)	С	436)	а
329)	b	330)	а	331)	d	332)	d	437)	d	438)	d	439)	b	440)	d
333)	d	334)	d	335)	b	336)	b	441)	а	442)	а	443)	b	444)	а
337)	С	338)	a	339)	d	340)	b	445)	а	446)	b	447)	а	448)	С
341)	d	342)	b	343)	d	344)	d	449)	b	450)	b	451)	С	452)	b
345)	b	346)	b	347)	b	348)	a	453)	b	454)	d	455)	b	456)	d
349)	b	350)	С	351)	С	352)	a	457)	b	458)	d	459)	а	460)	а
353)	С	354)	а	355)	b	356)	b	461)	b	462)	С	463)	b	464)	а
357)	а	358)	d	359)	а	360)	d	465)	b	466)	С	467)	С	468)	С
361)	С	362)	b	363)	а	364)	b	469)	b	470)	b	471)	d	472)	d
365)	а	366)	a	367)	С	368)	d	473)	С	474)	d	475)	а	476)	С
369)	С	370)	b	371)	d	372)	d	477)	С	478)	b	479)	b	480)	С
373)	С	374)	а	375)	С	376)	d	481)	С	482)	d	483)	d	484)	d
377)	а	378)	d	379)	а	380)	b	485)	а	486)	d	487)	С	488)	а
381)	d	382)	а	383)	С	384)	a	489)	d	490)	С	491)	а	492)	С
385)	b	386)	b	387)	С	388)	d	493)	а	494)	d	495)	d	496)	а
389)	d	390)	b	391)	С	392)	d	497)	а	498)	С	499)	а	500)	а
393)	а	394)	а	395)	d	396)	b	501)	а	502)	b	503)	b	504)	b
397)	а	398)	а	399)	d	400)	a	505)	а	506)	d	507)	d	508)	а
401)	b	402)	d	403)	b	404)	d	509)	b	510)	d	511)	С	512)	а
405)	b	406)	b	407)	С	408)	a	513)	d	514)	С	515)	b	516)	b
409)	b	410)	а	411)	b	412)	b	517)	С	518)	С				
413)	а	414)	b	415)	а	416)	b								
417)	а	418)	b	419)	С	420)	b								

NEET BIOLOGY

PLANT KINGDOM

: HINTS AND SOLUTIONS :

1 (a)

In pteridophytes, gametophytes (prothallus) require cool, damp and shady places to grow

2 **(a)**

Fern (Pteridophyta) and *Funaria* (Bryophyta) are on-seed producing plants, while *Ficus* and *Pinus* are seed producing plants.

3 **(d)**

Anthoceros is a hornwort (bryophyte) that harbours a nitrogen fixing blue-green algae (*Nostoc*) in its mucilage cavities. The association of *Nostoc* and *Anthoceros* is highly specialized form of symbiosis.

4 **(b)**

Gk. *Rhodo*-red; *Phyton*-plants. The characteristic red colour of algae is due to presence of excess amount of *r*-phycoerythrin (red in colour) which masks the colour of other pigments

5 **(b)**

The liverworts are widely distributed over the earth's surface but are far more numerous I the tropics than in other parts of the world. In India, they are abundant in the **Western Himalayas**, where rainfall is the heaviest.

6 **(a)**

In the alternation of generations the sporophytic generation is 2n and the gametophytic generation is n

7 **(c)**

All the chloroplast in the *Spirogyra* may be loosely or tightly coiled and run spirally in parallel. The band-shaped chloroplast is either narrow (having smooth margin) or broad (having serrated margin).

8 **(a)**

The leaves of *Selaginella* are microphillus. Each leaf is traversed by a single unbranched mid rib. A ligule arises from the base of each leaf (ligulate) they are delicate, green with entire or serrate margin and acute apex.

9 **(b)**

In *Dryopteris*, the mechanism of sporangium opening is effectively operated by **stomium**, when stomium ruptures the spores are discharged.

10 **(a)**

Chara possesses calcium encrustation and larvicidal properties.

11 **(a)**

Brown algae such as *Laminaria, Macrocystis, Fucus,* etc, are the main source of iodine.

12 **(b)**

In *Cycas*, the archegonia are foremed from the gametophytic cells lining the archegonial chamber. The number of archegonia formed in a gametophyte is variable, *e. g.*, 3 – 8 in *C. revoluta*, 3 – 6 in *C. rumphi* and 3 – 8 in *C. circinalis*.

13 **(b)**

Leaf, calyptra and protonema all are haploid and have same number of chromosomes.

14 **(b)**

Angiosperms are so named because the are enclosed with in a fruit of some sort

15 **(a)**

Double fertilisation is the fusion of one male gamete with female gamete (syngamy) and other male gamete with diploid secondary nucleus (triple fusion), *i.e.*, double fertilisation = syngamy = triple fusion

16 **(d)**

Seeds of *Pinus gerardiana* (gymnosperm) are commonly known as chilgoza.

17 **(a)**

Adiantum is also called walking fern. In *Adiantum*, the tips of the leaves, on coming in contact with the soil, given out adventitious roots which, in turn, produce new leaves and develop into new plants.

18 **(c)**

The capsule bears spores. Spores are formed after meiosis

19 **(a)**

The antherozoids of *Dryopteris* are large, coiled and multiflagellate structures which have a prominent vesicle and a nucleus.

20 **(b)**

Pteridophytes are vascular cryptogams. They generally produce spores but do not have seeds.

21 **(a)**

A-**Haplontic** The dominant multicellular phase is gametophyte or haploid

B-**Diplontic** The dominant multicellular phase is diploid or sporophytic

C-**Haplo-diplontic** The dominant phase is both is gametophytic (multicellular) and sporophytic (multicellular)

22 **(c)**

Some bryophytes have important medicinal uses. For example- The tea prepared from *Polytrichum commune* is used to dissolve kidney and gall bladder stones. Species of *Sphagnum*, a moss, provide peat that have long used as fuel. Many chemical product such as alcohol, ammonium sulphate, peat tar, paraffin, nitrates, brown dye, tanning, materials, etc., can be obtained from peat

23 **(b)**

In moss, the sporophyte is differentiated into foot, seta and capsule. Capsule bears spores, which give rise to gametophyte after meiosis, *e. g., Funaria, Polytrichum* and *Sphagnum*

24 **(c)**

Unlike bryophytes and pteridophytes, in gymnosperms (*e.g.*, *Pinus*, *Cycas*, etc.), the male and female gametophytes do not have an independent free-living existence. They remain within the sporangia retained on the sporophytes.

25 **(d)**

The stems are unbranched in *Cycas* or branched in *Pinus* and *Cedrus*. In *Cycas* leaves reduced and usually once pinnate circinate. The male or female cones or strobili may be borne on the some tree *(Pinus)* or on different trees (*Cycas*). In *Cycas* the archegonia are embedded in the female gametophytes and open into the archegonia chamber

26 **(a)**

The members of brown algae have gelatinous coating outside the, cellulose cell wall called align. Alginic acid is a phycocollioid extracted commercially from giant brown algae or kelps. Alginic acid is copolymer of α -1, 4 D-mammuronic acid and α -1, 4 L-glucuronic acid

27 **(d)**

Adult plant body of bryophyta is called gametophyte. Gametophyte is haploid that produces gametes.

28 **(b)**

The main difference between algae and bryophytes is that the sex organs are single celled, without a jacket of sterile vegetative cells in algae, whereas in bryophytes sex organs are always multicellular and protected by a jacket of sterile vegetative cells.

29 **(b)**

A- Cycas, B-Pinus, C-Ginkgo

30 **(b)**

Spirogyra in an unbranched filamentous green thallophyte. The chloroplast is pigment containing organelle having chlorophyll—a and b. The yellow pigments are carotene and xanthophyll.

31 **(a)**

The cells of *Spirogyra* are longer than their breadth. The cell wall is two layered. The inner wall is made up of cellulose and outer of pectose, when pectose comes in contact with water it gives the filament slimy or slippery. Hence, the alga is called pond silk.

32 **(d)**

Polysiphonia and *Gelidium* are belongs to class-Rhodophyceae

33 **(b)**

In pteridophytes, the sporophyte consist of leaflike appendages called sporophylls. Sporophyll in cluster form distinct compact structure called strobili or cones, *e*. *g*., *Selaginella* and *Equisetum*

34 **(b)**

In members of Chlorophyceae, meiosis is zygotic type.

35 **(d)**

In *Funaria*, apophyseal region is lowermost part of the capsule. The epidermis of the apophyseal region has stomatal apertures. Each stoma has two guard cells, which on later stages fuse to form 44 a single annular guard cell.

36 **(b)**

Gymnosperms lack ovary thus, fruits are absent. They possess naked seeds due to presence of naked ovules

37 **(d)**

The vegetative plant body of *Marchentia* is a dorsiventral lobed thallus. The sporophyte of bryophytes is known as sporogonium. The Sporogonium of *Marchentia* is differentiated into foot, seta and capsule. Asexual reproduction in *Marchentia* is takes place by the formation of gammae, which are located on the thalli

38 **(a)**

In Cyanophyceae many filamentous forms possess some specialized cells of disputed nature called **heterocysts**, which help in nitrogen fixation, *e. g.*, *Nostoc*, *Anabaena*, *etc*.

39 **(b)**

The reproduction in **mosses take place in water**, thus they occur in moist places.

40 **(a)**

Double fertilisation is characteristic feature of angiosperms. It was discovered by SG Nawaschin in 1898. In double fertilisation, one male gamete fused with ovum to form diploid zygote and the second male gamete fused with diploid secondary nucleus to form the triploid primary endosperm nucleus, which develops into endosperm. The endosperm provides, nutrition to the developing embryo

41 **(d)**

Male gametophyte bears antheridia, while female gametophyte bears archegonium, which produces, antherozoids and egg cell, respectively. Antherozoids are released in water, where it come in contact of archegonium and egg cell. It fuses with egg cell to produce the zygote. Zygote develops into young embryo

42 **(c)**

Peristome of *Funaria* sporophyte is involved in the dispersal of spores.

43 **(b)**

In bryophytes gametophytic phase is dominant, while in pteridophytes sporophytic phase is dominant

4 **(d)**

Gymnosperms lack ovary thus, fruits are absent. They possess naked seeds due to presence of naked ovules

45 **(d)**

In bryophytes the water is needed for (i) Dehiscence of antheridia

(ii) Liberation of antherozoids

(iii) Transfer of sperms from antheridia to archegonia

(iv) Opening of archegonial neck

(v) The movement of antherozoids into the archegonial neck

Thus, due to peculiar type of their habitat, they are regarded as 'the amphibians of the plant kingdom'

6 **(a)**

In gymnosperms, the nucellus is protected by envelops and this composite structure called ovule. Each ovule is actually the female sporeproducing organ surrounded by a protective envelope called integuments

47 **(c)**

Pinus belongs to **Coniferopsida**. The mature plant is large tree growing upto 30-70 m in height and differentiated into root, stem and leaves. Branches are arranged in acropetal order thus, giving the pyramid or conical shaped appearance to the tree.

48 **(c)**

Most algal genera are haplontic, some of them such as *Ectocarpus, Polysiphonia,* Kelps are haplodiplontic

49 **(a)**

Protein and starch.

Green algae store food in form of starch in specialized structures called pyrenoids located in chloroplast. Each pyrenoid has a central protein called 'pyrenocrystal' and a surrounding starch sheath

50 (d)

Due to the presence of *Trichodesmium*, a bluegreen algae, 'red sea' have their specific red colour.

51 **(d)**

In *Funaria*, there are **32** peristomial teeth arranged in two rings of 16 each.

52 **(c)**

Gk; *Phaios* = brown, *Phyton* = plants, Phaeophyceae cell contains more than one parietal chromatophores. The chromatophores contain chlorophyll-*a* and c β -and α -carotenes and xanthophylls. Besides, they contain large amount of brown coloured xanthophyll-fucoxanthin, which masks the green colour of chlorophylls and that is why these algae appear brown in colour

53 **(b)**

In *Spirogyra af finis*, the sexual reproduction occurs through conjugation (indirect lateral) in which adjacent cells of same filament conjugate, the protoplast of one cell (male gamete) migrates to the other (female gamete) then these protoplasts fuse to form zygospore which on germination forms, a single new filament.

Thus, from two adjacent filaments with 10 cells participating in reproduction 10 new filaments will be formed.

54 **(a)**

Liverwort (class-Hepatopsidae), any of more than 8000 species of small, non-vascular, sporeproducing land plants constituting part of the division bryophytes

55 **(b)**

The cortex in coralloid roots of *Cycas* is divided into inner and outer regions by algal zone. The cells of this zone contain endophytic algal forms particularly

Anabaena cycadeae and Nostoc punctiforme.

56 **(c)**

Both (a) and (b).

In case of isogamy, the gametes can be flagellated and similar in size (in Chlamydomonas) or nonflagellated (non-motile) but similar in size (as in *Spirogyra*)

57 **(a)**

Polyembryony is of common occurrence among the gymnosperms. This is possible because more than one archegonia are fertilized and more than one zygote are formed. These develop into embryos but only one of them succeeds in developing into a complete embryo. In the conifers, there is a cleavage polyembryony. In this case, all the four cells of the young embryo separate and develop into four embryos, but only one completely develops and others abort, *e. g.*, *Pinus*.

58 **(a)**

The united protoplasmic mass of two gametes is called **zygospore** (zygote). Prior to germination, the diploid zygospore nucleus undergoes meiosis and forms four nuclei, three of these abort and only one is functional. It undergoes transverse division to give rise single filament.

59 **(b)**

Most of the members of the brown algae are marine, excepts three-*Pleurocladia*. *Heribaudiella* and *Bodanella*, which are found in freshwater

60 **(a)**

The coralloid root of *Cycas* is symbiotically associated with nitrogen fixing blue-green algae, *Anabaena cycadae* and *Nostoc puntiforme*. These blue green-algae (cyanobacteria) are prokaryotic photosynthetic and autotrophic.

61 **(b)**

Dominant phase in ferns is sporophyte, which is differentiated into root (2*n*), stem and leaf

62 **(c)**

In mosses only capsule bears spores, which gives rise to gametophyte after meiosis and the sporophyte in masses is more elaborate than that in liverworks

63 **(b)**

Asexual reproduction in *Marchentia* occurs by the formation of gemmae. The gemmae are multicellular green and biconvex lens shaped bodies produced in gemma cups. They detach from gemma cup and germinate to produce new plants

64 **(d)**

The tallest flowering plant in the world is swamp gum (*Eucalyptum regnans*) found in Australia's Southern Island state Tasmania. They grow upwards of 100-101 meters tall and are 405 cm in diameter

65 **(c)**

Fusion of a large non-motile egg or ovum with a smaller motile sperm (except in Rhodophyceae). The gametes differ morphologically as well as physiologically and are called oogametes. The fusion of gametes is called oogamy, *e. g.*, *Chlamydomonas, Fucus, Chara* and *Volvox*

66 **(d)**

In bryophytes the diploid sporophyte is short lived and dependent upon the gametophyte

67 **(b)**

Nephrolepis is a pteridophyte.

68 **(b)**

The club mosses (division-Lycophyta) are now limited to representatives a few centimeters in height. Their leaves are small and scale like, resembling the leaf like structures of mosses. Club mosses of the genus—*Lycopodium*, commonly known as ground pine, form a beautiful ground cover in some temperate coniferous and deciduous forests.

69 **(b)**

In case of isogamy, the gametes can be flagellated and similar in size (in *Chlamydomonas*) or nonflagellated (non-motile) but similar in size (as in *Spirogyra*)

70 **(a)**

Ginkgo shows resemblance with both Cycadales and Coniferales. Resemblanes between *Ginkgo* and Cycadales are well-developed nuellar beak and pollen chamber, haustorial nature of pollen tube, multiflagellated spermatozoids, large egg, massive female gametophyte with well-developed venter, endoscopic embryo with two cotyledons, hypogeal seed germination.

Its resemblance with Coniferales are cone like appearance, long and dwarf shoots, pycnoxylic wood, uniseriate medullary rays, longitudinal dehiscence of microsporangia and sessile ovule, etc.

71 **(b)**

Though bryophytes are the land plants but water is essential for fertilization. It provides a medium of transport for antherozoids to reach archegonia. Hence, bryophytes are called amphibians of plant kingdom. Female sex organ is carpel also known as pistil or gynoecium. It consist of three parts style, stigma and ovary

73 **(b)**

Sago is obtained from the pith of *Cycas circinalis* and *Cycas revoluta*. It is rich in starch and used as constituent of poor man's food.

74 **(c)**

Artificial system of classification was given by Linnaeus and based on morphological characters such as habit, colour, number and shape of leaves, etc

75 **(c)**

The members of brown algae called sea weeds or kelps are the main source of **iodine**, *e.g.*, *Laminaria*, *Macrocystis* and *Fucus*.

76 **(d)**

Different systems of classification proposed from time to time have been divided into three basic categories, *viz.*, artificial systems, natural systems and phylogenetic systems

77 **(c)**

Laminaria is the example of class-Phaeophyceae. In this case, the plant body is usually attached to the substratum by a holdfast and has a stalk, the stripe and leaf like photosynthetic organ the frond

78 **(d)**

In isogamy, gametes are morphologically and physiologically same, in anisogamy gametes are morphologically different but physiologically same and in oogamy, gametes are both morphologically and physiologically different, *eg*, *Ulothrix* and *Spirogyra* members of Chlorophyeae.

79 **(a)**

Ciliated antherozoids and necessity of water for fertilization suggest that the bryophytes have originated from aquatic ancestors.

80 **(c)**

In gymnosperms the primary root commonly grows to become a thick central root, the tap root, which may or may not have thick lateral roots (branches)

81 **(d)**

In class-Chlorophyceae, the cells possess one or more chloroplasts. *The shape of chloroplasts may be*

Cup-shaped – *Chlamydomonas* Girdle-shaped – *Ulothrix* Spiral - *Spirogyra* Star-shaped – *Zygnema* Reticulate – *Chlamydomonas reticulata* Partial reticulate – *Oedogonium* Partial band-shaped – *Hydrodictyon* Disc-shaped - *Chara*

82 **(b)**

Some of the pteridophytes produce smaller spores called microspores and larger one called megaspore. This nature is called heterospory. In angiosperms there is only one functional megaspore. The male and female gametes fuse to form zygote which eventually developes into embryo. The embryo forms the seed.

83 **(d)**

Algae are predominantly aquatic occur both in marine as well as freshwater habitats. Some are terrestrial and grow in moist places. Some algae grow under very special environmental conditions such as hot water springs (thermal algae), ice and snow (cryophytes), on surface of other plants (epiphytes) and animals (epizoophytes) and in symbiotic association (lichen)

84 **(b)**

Pteridophytes are considered as first terrestrial plants to possess vascular tissues xylem and phloem. All the vegetative parts possess vascular tissues (*i.e.*, xylem and phloem) organised in definite groups

85 **(c)**

Vaginula is the part of venter of archegonium left at the base of seta. It is haploid in nature.

86 **(a)**

Sphaerocarpus belongs to order-Sphaerocarpales (Bryophyta).

87 **(b)**

Two synegirds and one egg cell.

Polygonum type of embryo sac is the most common in angiosperms. It is 7-celled and 8nucleate. The nuclei are arranged in such a way that three organized at micropylar end and form egg apparatus (one egg and two synergides,) two nuclei migrate to centre and form polar nuclei in a single central cell and three nuclei at chalazal pole organized into antipodal cells

88 **(d)**

In *Dryopteris*, meiosis takes place during spore formation.

89 **(d)**

Pinus is a gymnospermic plant. Ovulves of *Pinus* are uncovered, which lie on the megasporophyll, hence this plant does not have flowers. However it produces seeds (from ovule after fertilization) like other three plants mentioned, all of the other three are angiosperms.

90 **(d)**

The double fertilisation was discovered by SG Nawaschin (1898) and Guignard in *Lilium* and *Fritilaria*. Double fertilisation is restricted only to angiosperms. When pollen tube enters ovule, it strikes one of the synergids and burst open to release the two male gametes, which fuse with two different structures in the same female gametophyte. Thus, double fertilisation can be distinguished as.

(i) **Generative Fertilisation** Fusion of one male gamete with the egg producing diploid zygote or oospore

(ii) **Vegetative Fertilisation** Fusion of nucleus of second male gamete with the diploid secondary (fused) nucleus or the triple fusion, *i.e.*, fusion of one male nucleus and two polar nuclei forming endosperm (3n)

91 **(b)**

The presence of vessels in the xylem and abserce of archegonis are angiospermic character and also found in *Gnetum*.

92 **(a)**

Medicine ephedrine is obtained from several species of *Ephedra* of family-Ephideraceae. It is used in the treatment of respiratory disorders like cold, asthma, bronchial congestion.

93 **(a)**

The antheridial branch of *Funaria* is called male flower.

94 **(d)**

Gymnosperms (*Gymno* = naked; *sperma* = seed) are naked seeded plants, in which ovule is not covered by ovary. In gymnosperms, xylem contains only tracheids and xylem parenchyma; vessels are absent (exceptionally present in Gnetales).

95 **(c)**

Chlorella is used for purifying air in space ships. It is also used as food supplements by space travellers

96 **(b)**

The cones bearing megasporophyll with ovules are called female strobili or megasporangia or macrosporangiate. Both megasporophyll and microsporophyll may be present on same plant (*e. g., Pinus*) or may be present separately

97 **(b)**

In *Spirogyra* the gametophytic stage is dominant and sporophyte is single celled zygote

98 **(b)**

In all cycads except the genus *Cycas*, the ovules are borne on megasporophylls in megastrobili, in *Cycas* the ovules develop on individual leaf-like megasporophylls in what is regarded as a primitive arrangement. The microspores of all cycads develop into microstrobili

99 **(a)**

Red algae secrete and deposit calcium carbonate and appear like corals.

100 **(c)**

Pteridophytes are vascular, spore forming nonseed forming, non-flowering plants. The phloem of pteridophytes does not contain companion cells. Presence of **companion cells** is the characteristic feature of angiospermic phloem.

101 **(c)**

Zoospores.

Algae produce different type of spores, the most common being the zoospores, asexually. These are motile, flagellated and give rise to new plant on germination

102 **(d)**

The ovules of gymnosperms are unitegmic (apparently bitegmic in *Gnetum*). The integument is three layered. In gymnosperms, the ovules are freely exposed before and after fertilization, *i. e.*, they are not enclosed by an ovary wall.

103 **(a)**

A-Synergids, B-Polar nuclei, E-Central cell, D-Antipodal cells, E-Filiform apparatus, F-Egg cell *Polygonum* type of embryo sac is 7-celled 8nucleate, *i.e.*, composed of 3 antipodals, 2 synergid, one egg and one central cell

104 **(b)**

Agar, one of the commercial products obtained from *Gelidium* and *Gracilaria* is used to grow microbes and in preparation of ice-creams and jellies

105 **(a)**

Polysiphonia is the example of class-Rhodophyceae. It is red algae. The characteristic red colour of algae is due to presence of excess amount of *r*-phycoerythrin

106 **(a)**

Protonema is prostrate, branched, multicellular, filamentous structure, which bears erect foliose gametophore. Protonema is produced on germination of a moss (bryophyte) spore, from which new plants develop as buds.

107 **(d)**

Group	Major	Reserve		
	Pigment	Food		
Chlorophyceae	Chlorophyl	Starch		
	l – a, b			
Phaeophyceae	Chlorophyl	Laminarian,		
	l – a, c	mannitol		
Rhodophyceae	Chlorophyl	Floridean		
	l – a, d	starch		

108 (a)

Algae is a group of chlorophyll bearing, photosynthetic, autotrophic, thalloid plants. Except a few, all the algae are aquatic. The algae reproduce by vegetative, asexual and sexual means. *Ulothrix* is a filamentous algae and *Volvox* is in colonial form

109 **(c)**

In angiosperms, the pollen grains and ovules are produced in special structure called flower

110 **(c)**

The members of class-Chlorophyceae are commonly called green algae. Their cells possess one or more chloroplasts. Photosynthetic pigments in chloroplasts are chlorophyll-*a*, Chlorophyll-*b*, carotene and xanthophylls. The green colour is due to presence of excess of chlorophyll. Chloroplastic pigments are the same as in the land plants

111 **(d)**

Crude turpentine (oleoresin) is obtained from the long leaf of pine (*Pinus australis*) and slash pine

(*P. caribaea*). pine resin is obtained from chir pine (*Pinus roxburghii*) and blue pine (*P. wallichiana*) by tapping.

112 **(c)**

In *Cyas*, pollination occurs at three called stage. Microspore is sheded from the microsporangium at three-celled stage, *i. e.*, prothallial cell, tube cell and generative cell.

113 **(b)**

Sphagnum is bryophyte, commonly called as bog moss or peat moss. It is hygroscopic and possesses a remarkable water holding capacity. Hence, it is used as a packing material in the transportation of flowers, live plants, tubers, bulbs, seedlings, etc. It is also used in seedbeds and in moss-sticks.

114 **(c)**

In the angiosperm ovule, central cell of the embryo sac prior to the triple fusion, contains two haploid polar nuclei. Triple fusion in angiosperm is the fusion of second sperm with two polar nuclei or the secondary nucleus, which results in the formation of a triploid primary endosperm nucleus

115 **(d)**

The haploid gametophyte is dominant, long lived, green and independent whereas the diploid sporophyte is short lived and dependent upon the gametophyte

116 **(b)**

In *Cycas*, the leaves are of two types, *i. e.*, scale leaves and foliose leaves. Foliose leaves are large, compound and pinnately divided into many leaflets. Leaflet is sessile, straight, linearlanceolate.

117 **(a)**

The pteridophytes are flowerless, seedless, spore producing vascular plants which have successfully invaded the land. These are called vascular cryptogams because among cryptogams the vascular strands are present only in pteridophytes.

118 **(a)**

A-Sporophyte B-Haploid microspore C-Haploid megaspore

In gymnosperms the dominant phase is

sporophyte. They are neterosporous and produce

haploid megaspore and microspores. Which are produced with in sporangia born on sporophyll. These sporangia are arranged spirally along an axis to form compact cones

119 **(c)**

The plant body of algae is called thallus. The thalli of algae show a great variation of forms. Algae are photoautotrophic in their mode of nutrition. They perform photosynthesis due to presence of chlorophyll in their chloroplasts or chromatophores

120 **(c)**

All statements belong to class-Rhodophyceae

121 **(a)**

In gymnosperms the dominant phase is sporophyte, gymnosperms are heterosporous produced haploid megaspore and microspores, which are produced with in sporangia born on sporophyll. These spore bearing plants are called sporophytes

122 **(a)**

Liverworts reproduce asexually by the formation of specialised structure called gemmae or through fragmentation of thalli. Gemmae are asexual buds, which originate from small receptacles called gemma cups

123 **(d)**

Bryophytes are also known as amphibians of plant kingdom. They have various features, which enabled them to live on both land and on water habitats

124 **(b)**

Professor **M O P Iyenger** is know as **father of Inidan phycology**. Phycology is the study of algae (chlorophyllous thallophytes).

Professor **K C Mehta** worked on cause behind annual recurrence of wheat rust (fungi, *i. e.*, nonchlorophyllous thallophytes) in plains of northern India.

125 **(a)**

Sago starch is obtained from *Pinus*

126 **(c)**

The primary endosperm nucleus is triploid (3n) as it is the product of triple fusion

127 **(c)**

A-Antheridiophore, B-Archegoniophore, C-Gemma cup

Genera like Selaginella and Salvinia, which produce two kinds of spores, macro (large) and micro (small) spores are known as heterosporous

129 (c)

Pinus is either monoecious or dioecious. In monoecious condition male and female strobili are present on same plant and dioecious condition male and female strobili are present on different plant. Cycas have only dioecious condition

130 (a)

Agar (agar-agar) is polymer of D-galactose 3-6 anhydro L-galactose having sulphate esterification after tenth galactose unit.

131 (a)

Gymnosperms are naked seeded plants because seeds are presents on the megasporophyll and are 142 (c) not enclosed with fruit wall due to lack of ovary wall.

132 (c)

A-Dictyota, B-Polysiphonia, C-Porphyra, D-Laminaria, E-Fucus

133 (a)

Filament and anther. Male sex organ is stamen also known as androecium. It consists of an anther lobe and a

filament. Anther produces pollen grains

134 (c)

Cycas are heterosporous and in additions, produce highly specialised complex reproductive and dispersal structure called seeds. *Cycas* is also a dioecious plant. Dioecius plants are unisexual, having male and female reproductive organs on different individual (plants)

135 **(b)**

Chilgoza a gymnospermic seed that is eaten as dry fruit is produced by Pinus gerardiana

136 (a)

In moss (Funaria), the dispersal of spores is facilitated by hygroscopic pouring movements of peristomial teeth (lengthening and shortening of peristomial teeth). The inner peristome acts as a sieve allowing only few spores to escape at a time.

137 **(b)**

Bryophytes lack true-roots, stem or leaves. They possess root-like, leaf-like or stem-like structures

138 (a)

In *Cycas*, ovules are found without ovary, this condition is called naked ovule. Cycas produces largest ovules in the plant kingdom. The ovules are orthotropous and unitegmic.

139 (c)

Maiden hair fern, the common name given to the fern Adiantum capillus veneris, in which leaves are bi-pinnate with sori (clustered stalked sporangia) present sub-marginally.

141 (a)

The members of Myxophyceae or Cyanophyceae are commonly known as blue-green algae due to the presence of blue-green pigment -phycocyanin, *c* –phycoerythrin alongwith chlorophyll -a, β –carotene and myxoxanthin.

In *Pinus*, the microspore nucleus divides by a periclinal wall and forms a very small prothallial cell and large central cell. The central cell cuts off a second prothallial cell and antheridial cell. The nucleus of the antheridial cell divides to form generative cell and tube cell. Thus, the pollen grain of *Pinus* is sheded at four-celled stage when it consists of two vegetative prothallial cells, a generative cell and a tube cell.

143 (c)

Class-Phaeophyceae includes brown algae. Brown algae are marine plants. Chief pigments found in the members of this class are chlorophyll-a and c, β – carotene, violaxanthin, fucoxanthin, lutein and diatoxanthin. Reserve food is laminarian, mannitol and oils.

144 (a)

Haploid spore germinates to form a prothallus (gametophyte), which is monoecious, *i.e.*, has both antheridia (\vec{O}) and archegonia (\vec{Q})

145 (d)

Gymnosperms include medium sized trees or tall trees and shrubs. One of gymnosperms, the gaint red wood tree *Sequoia* is one of the tallest trees species

146 (b)

The spores are homosporous and germinate to produce independent cushion-like monocious gametophyte

A-	Marchentia	(male	thallus)
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- B- Marchentia (female thallus)
- C- Funaria

D- *Sphagnum*

148 (a)

Pollen grains.

Male sex organ is stamen also known as androecium. It consists of an anther lobe and a filament. Anther produces pollen grains

149 **(d)**

The only positive evidence of aquatic ancestry of bryophyte is ciliated sperms. Each sperm usually consists of minute, slender, spirally curved body furnished with two long, terminal whiplash type flagella

150 (c)

Heart-shaped prothallus is a gametophytic stage of fern. It contains male and female reproductive organs, so it is a monoecious structure.

151 **(d)**

Heterocysts are specialized cells found in bluegreen algae like Nostoc, Anabaenopsis, Anabaena, Rivularia,

Aulosira, Scytonema, etc.

152 **(c)**

Chemotaxonomy.

Numerical taxonomy which is now easily carried out using computers is based on all observable characteristics. Number and codes are assigned to all the characters and the data is then processed. In this way each character is given equal importance and at the same time hundreds of characters can be considered

153 **(a)**

The vegetative plant body of *Marchantia* is a dorsiventral lobed thallus. It is dichotomously branched. The upper surface is smooth whereas the lower surface bears a large number of unicellular rhizoids, which penetrate into the soil

154 **(a)**

Study of algae is known as **Phycology** while study of fungi is known as **Mycology**.

155 (d)

All statements are correct.

Sexual reproduction in bryophytes is oogamous type. The gametes are produced in complex, multicellular jacketed sex organs. The male reproductive organs area antheridia and female reproductive organs are archegonia. The haploid gametophytes is dominant, longlived, green and independent whereas the diploid sporophyte is short lived and dependent upon the gametophyte

156 **(d)**

The blue-green algae are prokaryotic and unicelled to filamentous. They have the chief photosynthetic pigments as chlorophyll -a, β – carotene, myxoxanthin, lutein, c – phycocyanin, c – phycoerythrin and allophycocyanin.

157 (d)

Structural embryology, phytochemistry, anatomy. Natural system of classification was developed by George Bentham and Joseph Dalton Hooker based on natural affinities among the organism. It was based on both external and internal features like phytochemistry, anatomy, ultra-structure, embryology

158 (c)

Dawsonia is the largest bryophyte (moss), which grows up to 70 cm. It is found in New Zealand and Australia.

159 **(d)**

Dryopteris, Pteris and *Adiantum* belong to class-Pteropsida of the division - Pteridophyta

160 **(b)**

Cycas revoluta is popularly known as **sago palm**. Sago (sabodana) is a starch obtained from stems and seeds of various species of cycads.

161 **(b)**

Pteridophytes are called vascular cryptogams because among cryptogams the vascular strands are present only in pteridophyte. All the vegetative parts possess vascular tissues (*i.e.*, xylem and phloem)

163 (c)

Sphagnum is employed for gauze to dress wounds and peat deposits are cut into blocks, dried and used as fuel.

164 **(c)**

Among plant imbibants phycocolloids, *e*. *g*., Agaragar are the best imbibants followed by protein, starch and cellulose.

Types of pigments present in the cell of algae is the most important character for classification.

167 (d)

Eichler (1883) divided plant kingdom into two sub-kingdoms.

Cryptogamae Plants having no flowers such as algae, fungi, bryophytes and pteridophytes.

Phanerogamae Plants having evident reproductive organs like flowers and seeds such as angiosperms and gymnosperms.

168 (a)

Calyptra is a small sheath of cells, derived from the archegonia, which covers top of the capsule.

169 **(b)**

A-Meiotically; B-Four

In gymnosperm megaspore differentiate to give rise to composite structure called ovule. Megaspore mother cell divides meiotically to give rise four haploid megaspores

170 (a)

In *Cycas*, archegonia are present, while antheridia remain absent. In ferns and mosses, both archegonia as well as antheridia are present.

171 **(b)**

In angiospermic plant pollen grain reaches to embryo sac after its germination on stigma and through pollen tube

172 **(b)**

In bryophytes, gametophytic plant body is dominated over sporophytic. Sporophytes are depend on gametophytes. Bryophytes like Polytrichum have largest gametophyte.

173 (a)

Old pine (*Pinus*) stumps are still being distilled to 180 (b) some degree as a source of turpentine and resin.

174 (c)

During formation of male gametes from pollen grains, the ratio of equatorial division that takes place in *Cycas* and angiosperms is 2 : 1 respectively.

175 (d)

In moss, the sporophyte is differentiated into foot, seta and capsule

176 (c)

Sexual reproduction involves the formation of gametes and their fusion during the process called fertilisation. Depending upon the structure and behavior of gametes, there are different types of sexual reproduction. These are

(i) Isogamy Fusion of morphologically alike gametes which look and behave similarly is called isogamy

(ii) Anisogamy Fusion of morphologically dissimilar gametes, which may be motile or nonmotile

(iii) **Oogamy** Fusion of a large non-motile egg or ovum with a smaller motile sperm (except in Rhodophyceae). The fusion of gametes is called oogamy

177 (d)

Sexual reproduction I *Spirogyra* takes place by conjugation. Scalariform conjugation occurs between the cells belonging to different filaments. Hence, these species are heterothallic. Lateral conjugation is primitive than scalariform conjugation.

178 (d)

An ideal embryo sac contains 7-cells and 8-nuclei. 3 cells are present at the micropylar end and form egg apparatus, mid of which forms egg cell and rest two lateral form synergids. One cell present in the centre of embryo sac, known as central cell and contains two nuclei and rest three cells are present at chalazal end for antipodal cells

179 (a)

During fertilisation in plants, one male gamete fuses with the egg cell and forms the zygote (this process is called syngamy). The other male gamete fuses with the secondary nucleus (this is called triple fusion). The syngamy and triple fusion together are called double fertilisation

Style, stigma and pistil.

Female sex organ is carpel also known as pistil or gynoecium. It consist of three parts style, stigma and ovary

181 (c)

Division- Angiospermae is sub-divided into two classes.

Class-Dicotyledonae and Monocotyledonae Monocot have one cotyledon whereas dicot have two cotyledons

182 (d)

Pinus is **heterosporous**. The sporogenesis results in the formation of micro and megaspores representing the first gametophyte cells.

184 **(a)**

Calyptra is a covering developed from the ventre of archegonium in bryophytes and pteridophytes. It acts as a transpiration shield around the immature capsule and provides protection to the young capsule.

185 **(b)**

Species of *Sphagnum*, a moss, provides peat (fuel)

186 **(d)**

Sexual reproduction in *Spirogyra* is accomplished by conjugation, which involves the fusion of two morphologically identical but physiologically dissimilar gametes. The conjugation is of two types-lateral and scalariform conjugation. Lateral conjugation is rarely found and takes place between two adjacent cells of same filament (*i. e.*, homothallic species).

187 **(c)**

Gymnosperms are divided into three classes, *i. e.*, Coniferopsida, Cycadopsida and Gnetopsida. Lycopsida and Pteropsida are related with pteridophytes, while Bryopsida is related to bryophytes.

188 **(a)**

Haploid endosperm is formed only in *Cycas* while apogamy is found only in *Pteris*.

189 **(d)**

Brown algae (*Laminaria*) are rich in sodium, potash and iodine. About 7% of total world production of iodine is obtained from kelps in Japan.

190 **(d)**

Algae reproduce by vegetative, asexual and sexual methods. The vegetative and asexual methods are abundant. Algae reproduce vegetatively by fragmentation and asexually by means of motile or non-motile spores. Sexual reproduction occurs through fusion of two gametes

191 **(d)**

In brown algae, sexual reproduction is isogamous (in *Ectocarpales*), anisogamous (in *Cutleriales*) and oogamous (in *Fucus, Laminaria, Dictyota*, etc). In most of the brown algae, the gametes are pyriform form and flagellated. Fertilisation is external, *i.e.*, the gametes fuse outside the gametangia in water

192 **(c)**

Sphagnum is commonly called as 'bog moss' or 'peat moss'.

193 **(a)**

In *Equisetum*, the anterior part of the antherozoid (sperm) is spirally coiled and has numerous flagella, whereas posterior part is somewhat expanded. The sperms of *Lycopodium*, *Riccia* and *Anthoceros* are biflagellated.

194 **(c)**

Angiosperms are divided into two classes dicotyledons and monocotyledons. Dicotyledons have two cotyledon in their seed and monocotyledon have one

195 **(a)**

Cycas seed is **dicotyledonous** and **endospermic**. In *Cycas*, fleshy female prothallus is called endosperm, which function as a food storage region of the seed.

196 **(c)**

In bryophytes each sperm usually consists of minute, slender, spirally curved body furnished with two long, terminal whiplash type flagella. The sperms are liberated from antheridia, swim in a film of water and attracted towards the archegonium. They enter into the archegonia and fertilise the egg and form zygote. Zygotes do not undergoes reduction division immediately. They produce a multicellular body called a sporophyte

197 **(d)**

Dryopteris, Pteris and *Adiantum*belong to class-Pteropsida of the division-Pteridophyta.

198 **(a)**

The 13-celled microspore of male gametophyte in *Selaginella* is sheded from microsporagium, which is having 1-prothallial cell + 8-jacket cells +4-androgonial cells (i.e., 8+4=12 antheridial cells).

199 **(b)**

In haplontic life cycle gametophyte is dominant and sporophyte is single celled zygote. Haplonts are (i) Most fungi

200 201	 (ii) Some green algae, <i>e. g., Chlamydomonas</i> (iii) Many Protozoa, <i>e. g., Plasmodium</i> (a) Carrageenin is obtained from <i>Chondrus</i>. (b) In ferns about 32 multiflagellate, spirally coiled sperms are produced in antheridium. These sperms swim towards open archegonia due to the presence of malic acid in the later, <i>i. e.</i>, they show chemotaxy. 	208	The sporophyte of <i>Funaria</i> consists of a foot, a long slender seta and a capsule. The capsule wall is several layers thick and is highly differentiated. The outermost layer is the epidermis which contains numerous stomata in the apophysis region, fewer in the theca region and none in the opercular region. (b) Bacillariophyceae - Golden brown algae (diatoms)
202	(b) <i>Pinus</i> is monoecious, which bear male cone as well as female cone on the same tree at separate branches.		Chlorophyceae - Green algae Xanthophyceae - Yellow-green algae Phaeophyceae - Brown algae.
203	Marchantia, Cycas and papaya are dioecious plants. (d) Endosperm in a gymnospermic plant is a haploid structure, which is formed without fusion of gametes and represent female gametophyte. Leaf of gymnosperm belongs to diploid generation. 2n = 16, n = 8. So, number of chromosomes in endosperm of	209 210 211	 (a) Gametophyte is gamete bearing, haploid multicelled stage of many plants, beginning with haploid spores and ending at fertilisation (b) A-<i>Selaginella</i>, B-<i>Equietum</i>, C-Fern, D-<i>Salvinia</i> (b) Pollen grain from anther after dispersal reaches to the stigma of ovary with the help of various agents like wind, air, insects. This process is
204	gymnosperm will be 8. (b) The green algae <i>Cephaleuros virescens</i> causes red rust of tea, thus, destroying the tea leaves. Similar disease is caused by the species of <i>Cephaleuros</i> to coffee plant, piper and <i>Citrus</i> species.	212 213	 known as pollination (a) <i>Ephedra</i> (gymnosperm) is a bushy trailing shrub. Drug ephedrine is obtained from <i>Ephedra</i>. This drug is used in curing respiratory ailments including asthma. (d)
205	(b) Blue-green algae or cyanobacteria have prokaryotic organization. There is no true nucleus and membrane bound cells organelles like mitochondria, chloroplasts, ER, Golgi body, etc, in prokaryotic cell. The DNA of prokaryotic cells lack histone proteins.	214 215	In <i>Spirogyra</i> , sexual reproduction occurs through conjugation resulting into the formation of zygospore, while in <i>Funaria</i> , <i>Pteris</i> and <i>Cycas</i> zooidogamous oogamy occurs. (a) A- <i>Funaria</i> -Moss; B- <i>Sphagnum</i> -Moss (b)
206 207	 (a) Pollination occurs once a genetically compatible pollen grain lands directly on the ovule. The pollen grain germinate and grows into the ovule, penetrating the female gametophyte and eventually fertilising an egg nucleus (c) 	217 218	The smallest flowering plant in the plant kingdom is aquatic. It is <i>Wolffia</i> , commonly known as water meal or duck weed (c) <i>Funari, Polytrichum</i> and <i>Sphagnum</i> are the examples of mosses (d)

The pollen sac in *Cycas* is called **microsporangium**. Each mature microsporangium is an oval body attached by a short stalk at one end. It produces a large number of microspores (pollen grains).

219 **(a)**

The apophysis of moss **capsule** contains chloroplast bearing parenchymatous cells, called as chlorenchyma. Due to presence of chloroplasts, chlorenchyma cells have the ability to prepare food by the process of photosynthesis.

220 **(c)**

Bryophytes are dependent on water for reproduction, because sperms must swim to the archegonia. They are partly adapted to the land, because the gametes develop in protective structures, *i.e.*, antheridia and archegonia. So, bryophytes are also called 'amphibians of the plant kingdom'

221 **(a)**

Phylogenetic system of classification was given by Engler and Pranti based on evolutionary relationship of organism. It is also known as Hutchinson's system

222 **(c)**

Cyanobacteria (blue-green algae) were first photosynthetic organisms. They contain photosynthetic lamellae equivalent to thylakoids hence, these are autotrophic.

223 **(d)**

In bryophytes, the most conspicuous phase in life cycle is the gametophyte. It is independent and concerned with reproduction. In *Sphagnum*, male and female gametophytes are independent and free living.

224 **(a)**

Chlamydomonas, Volvox, Ulothrix, Spirogyra and *Chara* are the examples of class-Chlorophyceae

225 **(d)**

Agar is obtained from *Gelidium, Gracilaria, Chondrus, Ceramium*, etc., and used in microbiological works to solidify culture media. Green unicellular algae such as *Chlorella* and *Chlamydomonas* are used in sewage disposal ponds. They remove CO_2 and restore O_2 by the process of photosynthesis and make the sewage water enhitable for many fishes and aerobic bacteria. *Porphyra Laminaria* and *Sargassum* are used as food

226 **(b)**

The multicellular female gametophyte is retained with in megasporagium

227 **(c)**

Anthoceros belongs to class-Anthocerotopsida of division-Bryophyta.

228 **(d)**

From the pith of *Cycas revoluta* sago (starch) is obtained, while the seeds of *Cycas rumphi* and shoots of *Cycas pectivaler* and *Cycas circinalis* are cooked and eaten as a source of starch by tribals in India. Some species of *Cycas* are grown as ornamental plants.

229 **(b)**

Endosperm in angiosperms develops as a fusion product of secondary nucleus with male gamete. Secondary nucleus is diploid structure formed by fusion of haploid chalazal polar nucleus and haploid micropylar polar nucleus. Zygote is formed by the fusion of male gamete with egg

230 **(c)**

The microsporophyll is a brown coloured triangular structure consisting of a short stalk or filament and leaf like flattened structure or 'anther'. Each sporophyll is provided with two microsporangia on its abaxial surface.

231 **(c)**

Chlorella is used for purifying air in space ships.

232 **(d)**

Pteridophytes are called vascular cryptogams, also known as seedless vascular plants. They produce spores rather than seeds. These include horse tails and ferns

233 **(a)**

Pyrenoids are centrally placed protein bodies surrounded by starch sheath, which are present in chloroplast in the leaves of *Funaria*.

234 **(c)**

Bryophytes mostly occur in humid damp and shaded localities. The bryophytes are widely distributed throughout the world, especially in moist mountain forests of tropics, sub-tropics and Antarctic regions

The unicelled microspore of *Pinus* undergoes three divisions of microgametogenesis, so as to form a four celled pollen grains or male gametophyte. There are two prothallial cells, a generative cell and a tube cell.

236 **(b)**

A-Capsule, B-Seta, C-Sporophyte, D-Gametphyte

237 **(d)**

Member of Chlorophyceae are unicellular, colonial or filamentous have definite chloroplast commonly known as green algae

238 **(b)**

Corolloid root is developed in *Cycas*. It contain an algae zone in the cortex. This algal zone contains blue-green algae (cyanobacteria) like *Nostoc*, *Anabaena*, which grow in symbiotic association with corolloid root

239 **(c)**

Natural system of classification was developed by George Bentham and Joseph Dalton Hooker based on natural affinities among the organism. It was based on both external and internal features like phytochemistry, anatomy, ultra-structure, embryology

240 **(a)**

The major difference between angiosperms and gymnosperms is found on the seed. This is where angiosperm seeds are coated with in the fruits. While on the other hand, gymnosperm seeds are exposed

241 **(d)**

In gymnosperms the sporophytic phase is dominant and the gametophytic phase is dependent on sporophyte.

242 **(a)**

In angiosperm, pollen grain reaches to embryo sac after its germination on stigma and through pollen tube. Pollen tube carries two male gamete and discharge it into embryo sac

243 **(c)**

Selaginella bryopteris is commonly called **sanjeevani booti.**

244 **(b)**

In *Dryopteris* (pteridophyte), the sporophytic phase is independent and autotrophic, whereas in *Funaria* (bryophyte), the sporophytic phase is dependent on gametophytic phase.

245 **(d)**

Retort cells occur in Sphagnum.

246 **(b)**

*Chlamydomonas*occurs in stagnant water (ponds and ditches), though some species are marine.

247 **(c)**

A mycorrhiza is a symbiotic association of a fungus with a roots system. The fungus provides minerals and water to the roots, in turn the roots provide sugar and N-containing compounds to the mycorrhizae. Some plants have the obligate association with mycorrhizae. For example, *Pinus* seeds cannot germinate and establish without the presence of mycorrhizae.

248 **(c)**

The members of class-Chlorophyceae are unicellular, colonial or filamentous have definite chloroplast commonly known as green algae. They are green due to the presence of chlorophyll-*a* and *b* pigments localised in chloroplast

249 **(b)**

In *Pinus*, the pollen grains at maturity are protected by three layered wall, outer most exine the second exo-intine forms two balloon like outgrowths called **wings** and third is intine. Wings help in transportation of pollen grain from one place to another place.

250 **(d)**

The rhizoids in *Funaria* arise from the **basal region** of the stem, which functions as roots.

251 **(c)**

Endosperm in angiosperms develops as a fusion product of secondary nucleus with male gamete. Secondary nucleus is diploid chalazal polar nucleus and haploid microphylar polar nucleus

252 **(d)**

The bryophytes represent two morphologically distinct generations, *i. e.*, gametophytic and sporophytic. The gametophytic phase is dependent upon as well as being permanenty attached to the gametophyte, *e. g.*, *Riccia*, *Marchantia*.

253 **(a)**

Out of these, *Equisetum* is a vascular cryptogam.

254 **(c)**

Both statements are true

255 (d)

The giant red wood tree is a gymnosperm. The gaint *Sequoia* is the world's most massive tree and arguable the largest living organism on earth

256 **(d)**

In bryophytes, zygote is the beginning of the sporophytic generation. Within venter of the archegonium, the zygote undergoes segmentation and develops without a resting period into a multicellular, undifferentiated structure called embryo. The embryo by further segmentation and differentiation finally develops into a full fledged sporophyte, called sporogonium.

257 (d)

All the statements are correct.

Sexual reproduction occurs by the formation of sex organs born on special branches.

The male antheridia are produced on

antheridiophore and the female reproductive organs are 'archegonia'. They are borne on special stalked structures called archegoniophore. Both male and female sex organ may be present on same thalli or different thalli.

After fertilisation, the egg becomes zygote, which grow to form sporophyte. It is differentiated into foot, seta and capsule. Inside the capsule, the diploid spore mother cells divide by meiosis and produce haploid spores. These spores germinate to form free-living gametophytes

258 **(a)**

Elaters are hygroscopic and help in dispersal of spores.

259 **(a)**

On the basis of involvement of cells, sporangium development is of two types :

Leptosporangiate (only one cell takes part)

Eusporangiate (a group of cells takes part).

260 **(c)**

In ferns, sporangium consists of stalk and capsule, later is filled with sporocytes, which undergo meiosis to produce haploid spores. The one layered wall of the capsule is thin and has a strip of cells called annulus. The cells of annulus have thickenings on the inner and radial walls but in some regions, its cells are thin walled. These regions are called stomium. Both annulus and stomium help in spore dispersion.

261 **(a)**

The characteristic red colour of algae is due to presence of excess amount of *r*-phycoerythrin, which masks the colour of other pigments

262 **(a)**

Chlorella is a unicellular green alga belonging to the class-Chlorophyceae, order-Chlorococcales and family-Chlorellaceae. It contains very high percentage of proteins and fats and also contains most of the known vitamins.

263 **(b)**

Water blooms are formed by the growth of some microscopic or semi-microscopic algae such as *Anabaena, Arthrospira, Nodularia, Nostoc,* etc. water blooms may be harmful because they are indirectly responsible for fish mortality due to depletion of oxygen.

264 **(a)**

Evolutionary relationship of organism

265 **(c)**

Dryopteris has circinate vernation of leaves but is homosporous.

Circinate vernation and heterospory is found in *Cycas*.

266 **(a)**

Endosperm in *Pinus* (gymnosperm) is formed before fertilization, *i. e.*,**haploid**.

267 **(c)**

Most of the members have one to many storage bodies called pyrenoids located in the chloroplast. Pyrenoids contain protein besides starch

268 **(a)**

True fertilisation together with triple fusion is known as double fertilisation, a unique phenomenon only occurs in angiosperms (absent in gymnosperms with few exception) and first time demonstrated by *Nawaschin* in *Fritillaria* and *Lilium*

269 **(b)**

Spirulina.

Spirulina (blue-green algae) is highly rich in proteins, vitamin-B complex and minerals. Powdered *Spirulina* is being used in herbal tonics and biscuits, *Chlorella* (50-55% proteins) and

Porphyra (25-30% protein) are also used as a source of proteins

270 **(b)**

The spores of *Equisetum* when young are green and covered by a thin wall of cellulose. At maturity, they are relatively larger, rounded and contain numerous chloroplasts.

271 **(c)**

The leaves in pteridophytes are small (microphylls) as in *Selaginella* or large (macrophylls) as in fern

272 **(b)**

A- Biflagellate antherozoids, B-One egg

273 **(a)**

Heterosporous pteridophytes like *Selaginella* and *Marsilea* always produce dioecious gametophyte because microspore will form male gametophyte and megaspore will form female gametophyte

274 **(a)**

Volvox and Fucus.

Fusion of a large non-motile egg or ovum with a smaller motile sperm (except in Rhodophyceae). The gametes differ morphologically as well as physiologically and are called oogametes. The fusion of gametes is called oogamy, *e. g.*, *Chlamydomonas, Fucus, Chara* and *Volvox*

275 **(a)**

Gametophyte refers to haploid plant that produces gametes. In **ferns**, haploid spore on germination gives rise to gametophyte, which is also called, **prothallus**. It bears both globose **antheridia** (male reproductive structure) and flask shaped **archegonia** (female reproductive structure).

276 **(a)**

Gametophyte and sporophytic phases are present in life cycle of bryophytes and both phases are morphologically distinct. The gametophytic phase is more conspicuous independent and dominant while sporophyte depends on gametophyte.

277 **(a)**

The plant body of bryophytes is more differentiated than that of algae *Difference between bryophytes and algae* (i) In bryophytes, tissue differentiation is welldeveloped, while in algae it is found only in higher forms (ii) In algae, isogamous, anisogamous and oogamous type of sexual reproduction occur, while in bryophytes only, oogamous type of sexual reproduction is present
(iii) In bryophytes, sex organs are covered by a sterile jacket, while it is not covered in algae
(iv) Female sex organ in bryophytes is archegonium, while it is oogonium in algae
(v) In bryophytes sporophyte is dependent upon gametophyte, whereas in algae sporophyte is independent of gametophyte
(vi) Embryo is found in bryophytes, while it remains absent in algae
(vii) Sporophyte in bryophytes is differentiated into foot, seta and capsule

278 **(b)**

Microsporangia.

In gymnosperm, microspores develop into a male gametophytic generation, which is highly reduced and is confined to only a limited number of cell. This reduced gametophyte is called a pollen grain. Its development takes place in microsporangia

279 **(b)**

A-Zygote; B-Syngamy

In angiospermic sexual reproduction, syngamy is the nuclear fusion of the one male gamete with the egg producing diploid zygote or oospore

280 **(b)**

Numerical taxonomy which is now easily carried out using computers is based on all observable characteristics. Number and codes are assigned to all the characters and the data is then processed. In this way each character is given equal importance and at the same time hundreds of characters can be considered

281 **(a)**

Haplontic life cycle is primitive type of life cycle. Haplontic life cycle is followed by algae such as *Spirogyra, Volvox* and *Chlamydomonas*

282 **(c)**

In mosses the first stage is protonema stage, which develops directly from a spore

283 **(d)**

A fern (pteridophyte) differs from a moss (bryophyte) in the presence of independent sporophyte, while in moss the sporophyte is simpler than the gametophyte and remains attached to the parent gametophyte throughout its life. This sporophyte is dependent upon gametophyte partially or wholly for its nutrition.

284 **(a)**

Cell of sporophyte undergo meiosis of produce haploid cells called spores. As these spores are haploid in nature. It means each spore further divide to develop into the multicellular haploid generation of a plant. Thus, the number of chromosomes in leaf as well as in the spore will be same, *i.e.*, n = 20 ans

285 **(b)**

Pteridophytes are vascular cryptogams, bryophytes are non-vascular cryptogams. Pteridophytes are most primitive vascular plants and are also known as vascular cryptogams

286 **(b)**

Cycas stem shows large amount of parenchyma with secondary xylem tracheids. This type of wood is soft wood/manoxylic wood.

287 **(d)**

Pteridophytes constitute a group of cryptogams having well developed vascular tissue. These plants lack seed (although seed habit is seen in *Selaginella*).

288 **(c)**

In brown algae food is stored as complex carbohydrates, which may be in the form of laminarin or mannitol

289 **(d)**

The haploid unicellular spore of fern on germination forms prothallus, which possesses haploid, brown, hairlike delicate unicellular outgrowths. These are called rhizoids.

290 **(b)**

Gymnosperms lack ovary thus, fruits are absent. They possess naked seeds due to presence of naked ovules

291 **(d)**

All the statements are correct.

In mosses vegetative reproduction occurs through fragmentation or through bud in secondary protonema

292 **(b)**

Alginic acid or alginate is found in the middle lamella and primary cell walls of sea weeds such as, *Laminaria*, *Macrocystis*, *Ascophyllum*, etc. Chlorophyll -b is absent in brown algae. The colour of brown algae varies from olive green through light pigment fucoxanthin ($C_{40}H_{54}O_6$) in their chromatophores. This contain in addition to chlorophyll -a, chlorophyll -c, carotene and xanthophylls.

294 **(c)**

Bryophytes are autotrophic, non-vascular, spore forming, gametophytic plant body lacking seed habit.

295 **(a)**

Ginkgo biloba is a gymnospermic plant. It is also known as living fossil because it has a great fossil history.

296 **(a)**

Acetabularia is a single celled marine green alga.

297 **(d)**

Bryophyta includes simplest and primitive land plants characterized by presence of independent gametophyte and parasitic sporophyte.

298 **(c)**

Sclerenchyma cells are thick walled, lignified and dead at maturity. These provide mechanical support to the *Pinus* needle. Sclerenchyma may be fibrous or sclereid.

299 **(a)**

A-Ectocarpus, B- Polysiphonia, C-kelps

300 **(d)**

Agar-agar is obtained from

Gelidium and *Gracilaria*. Agar-agar is used in solidifying laboratory culture media and is added as stabiliser or thickener in the preparation of jellies, puddings, creams, cheese, bakery, etc.

301 **(c)**

In gymnosperms megaspores develops into multicellular structure called multicellular female gametophyte that bears two or more archegonia or female sex organs

302 **(b)**

If the leaf of *Funaria* has 5 chromosomes, the primary protonema will have 5 chromosomes

303 **(b)**

Pollen grain.

In gymnosperm, microspores develop into a male gametophytic generation, which is highly reduced and is confined to only a limited number of cell.

This reduced gametophyte is called a pollen grain. Its development takes place in microsporangia

304 **(c)**

Angiosperms.

The double fertilisation was discovered by SG Nawaschin (1898) and Guignard in *Lilium* and *Fritilaria*. Double fertilisation is restricted only to angiosperms. When pollen tube enters ovule, it strikes one of the synergids and burst open to release the two male gametes, which fuse with two different structures in the same female gametophyte. Thus, double fertilisation can be distinguished as

(i) **Generative Fertilisation** Fusion of one male gamete with the egg producing diploid zygote or oospore

(ii) **Vegetative Fertilisation** Fusion of nucleus of second male gamete with the diploid secondary (fused) nucleus or the triple fusion, i.e., fusion of one male nucleus and two polar nuclei forming endosperm (3n)

305 **(c)**

Algae produce different type of spores, the most common being the zoospores, asexually. These are motile, flagellated and give rise to new plant on germination

306 **(c)**

In green algae vegetative reproduction takes place by cell division, fragmentation, stolons tubers and different types of spores

307 **(c)**

In class-Rhodophyceae the photosynthetic pigments located in the chromatophores are chlorophyll-*a*, *d*, α - β -carotene, xanthophylls and biliprotein (*r*-phycoerythrin) (red in colour) and *r*-phycocyanin (blue in colour)

308 **(a)**

In mosses, the sporophyte developing from the embryo is a simple structure without rhizoids and is differentiated into foot, seta and capsule. **It is parasitic** (partially or wholly) **on the gametophyte** as it is organically attached and is nutritionally dependent upon the gametophyte.

309 **(c)**

Gymnosperms are characterised by presence of naked ovules, which develop into seeds. The ovular integuments form the seed coat. Haplontic life cycle is followed by algae such as *Spirogyra*

311 **(d)**

Salvinia, family-Salviniaceae is heterosporous fern, producing spores of different sizes.

312 **(c)**

Schizogenous(Schizein, to split) cavities are formed by the splitting up of common walls and the separation of masses of cells from one another. Inter-cellular spaces and these cavities form an inter-communicating system so, that gases and liquids can easily diffuse from one part of the plant body of the other. Most **resin-ducts** in plants especially **gymnosperms**, oil ducts (sunflower) are schizogenous cavities.

313 **(b)**

The fusion of male and female gametes is called fertilisation

314 **(c)**

Division/phylum A-angiospermae is sometimes called division-Anthophyta (anthe-flower; *phyto*plant) because the common name for this group is the 'flowering plants'

315 **(c)**

The rhizoids in *Funaria* arise from the basal region of the stem, which functions as roots. These are multicellular and branched. The gemmae are multicellular, green and biconvex lens shaped bodies produced in gemma cup. *Sphagnum* is used as a packing material in the transportation of flower, live plants, tubers, bulbs seedlings, etc. It is also used in seed-beds and in moss-sticks. Mosses colonise on barren rocks along with lichens decompose rocks

316 **(b)**

In brown algae asexual reproduction takes place by the formation of motile zoospores and nonmotile neutral spores. The zoospores are usually produced inside the zoosporangia. They are pyriform, biflagellate and have chromatophores, contractile vacuoles and eye spot. They have heterokont flagellations, *i.e.*, possess two unequal flagella, one whiplash type and the other tinselshaped

317 **(b)**

Sporophyte of fern produces spores. The spores germinate to produce haploid gametophyte, called prothallus. The prothallus bear antheridia and archegonia on their undersides

318 **(a)**

In pteridophytes, spore is a haploid structure, which develops after meiosis in the spore mother cell. On germination, it gives rise to a green haploid prothallus (gametophyte) which is monoecious, *i. e.*, has both antheridia (male sex organs) and archegonia (female sex organs).

319 **(d)**

Diploxylic vascular bundle is found in rachis and leaflet of *Cycas, ie,* centripetal and centrifugal xylem are present at same time.

320 (a)

Alga is defined as an organism with chlorophyll -a and thallus like body. These are haploid gametophytic, eukaryotic, chlorophyllous, non-vascular organisms.

321 **(d)**

Sphagnum and other mosses are the chief constituent of peat, that is why *Sphagnum* is called **peat moss.**

322 **(a)**

The main plant body in pteridophytes is sporophyte (2n) which is differentiated into root (2n), stem and leaf

323 (d)

All statements are correct

324 **(c)**

Both bryophytes and pteridophytes require water for fertilization.

325 **(d)**

Ferns exhibit alternation of dominant sporophyte generation with an inconpicuous gametophyte generation (heteromorphic)

327 **(c)**

Bryophytes are non-vascular thalloid, spore forming plants. Their main plant body is gametophytic, which is an independent, autotrophic, haploid gametes bearing phage of bryophytes.

328 **(b)**

In gymnosperm pollen grain is released from microsporangium and carried with the help of air current. It comes in contact with opening of ovule

329 **(b)**

A-Antheridial branch; B-Archegonial branch 330 **(a)**

Myxophyceae (cyanobacteria, blue-green algae) have incipient nucleus, in which nuclear envelope is absent.

332 **(d)**

Sporophyte - Diploid (2*n*) Antheridia – Haploid (*n*) Rhizoids - Haploid (*n*)

333 **(d)**

Hypnospores are the means of asexual reproduction in *Chlamydomonas*. Sometimes, the protoplasts of palmella develop a thick wall to form the hypnospores. They may develop a redcoloured pigment haematochrome in *Cinivalis* and thus, causing the phenomenon of red snow. On the arrival of favourable conditions, they develop into zoospores.

334 **(d)**

The gaint brown algae are called kelps. The largest kelps are *Nereocystis* (20-30 m) and *Macrocystis* (40-50 m). Brown algae have gelatinous coating outside the, cellulosic cell wall called algin. Alginic acid is extracted commercially from gaint brown algae or kelps. Many brown algae are used as food in some countries. Food obtained from *Laminaria saccharina* is known as 'kombu'. It is rich in carbohydrates

335 **(b)**

Double fertilisation is characteristic feature of angiosperms. It does not take place in algae, bryophytes, pteridophyte and most gymnosperms. True fertilisation together with triple fusion is known as double fertilisation

336 **(b)**

A-Strobilus, B-Node, C-Branch

337 **(c)**

In angiosperms, flower bears male and female sex organs. Male sex organ is stamen also known as androecium. It consist of an anther lobe and a filament. Anther produces pollen grains. Female sex organ is carpel also known as pistil/gynoecium. It consists of three parts style, stigma and ovary

338 **(a)**

After fertilisation the ovaries develop into fruit 339 **(d)**

Porphyra is used as food in various countries and *Rhodymania palmata* is chewed as tobacco in Scotland.

340 **(b)**

In Ulothrix, meiosis occurs in zygospore.

341 (d)

Juvenile stage of moss is protonema, which develops directly from a spore. It is a creeping, green, slender, branched and frequently filamentous stage

342 **(b)**

Fruits are mature ovaries. The ovules develop into the seeds, the integuments become the seed coat and the ovary becomes the fruit

343 (d)

Megasporophyll of *Cycas* bears ovules, hence, it is equivalent to **carpels** of angiosperms.

344 **(d)**

Bryophytes shows considerable economic importance. They colonise on barren rocks along with lichens and decomposed rocks. When they grow on rocks, the help in soil formation. Some bryophytes also work as soil binders when they grow in aggregations

345 **(b)**

Each microsporophyll has two microsporangia on the **abaxial** surface. In microsporangium, are developed.

346 **(b)**

The plant body of bryophytes are multicellular, thallus like, prostate or erect, many celled thick and fixed to soil by unicellular or multicellular rhizods. These rhizoids are without vascular tissue and cytoplasm

347 **(b)**

In some pteridophytes, two types of spores are formed which differ significantly in their size and also in function. This phenomenon is called heterospory, *e.g.*, *Selaginella* and *Marsilea*, etc.

348 (a)

Bryophytes including liverworts, hornworts and mosses shown alteration of generations



349 **(b)**

About 90% of the total green algae grow in freshwater environment. The algae is divided into

three main classes *i.e.*, Chlorophyceae, Phaeophyceae and Rhodophyceae

350 **(c)**

Mosses are the bryophytes with gametophytic plant body, *e.g.*, *Funaria*. On the lower portion of leafy gametophore of moss, numerous branched multicellular rhizoids with oblique septa are present. These rhizoids are meant for the purpose of attachment or anchorage to the substratum.

351 (c)

In *Vaucheria*, the reserve food material is oil (instead of starch) occurring as small colourless droplets in the cytoplasm. However, filaments growing in continuous light may accumulate food in the form of starch.

352 **(a)**

Coralloid roots have an algal zone in middle cortex. Some nitrogen fixing blue-green algae like *Anabaena, Nostoc, Cycadacearum* are found in algal zone.

353 **(c)**

In *Cycas* the 3-celled microspores are shed in the air after the dehiscence of the sporangium. They are very light in weight and are carried by air current (anemophily).

354 (a)

Spore is the first cell of gametophytic generation in *Funaria*. On approach of favourable conditions, the spore absorbs water. Now, the exine ruptures and intine comes out in form of germ tube. It divides and enlarges to form a branched alga-like filamentous **protonema**.

355 **(b)**

Inorganic phosphorus and nitrogen are responsible for the growth of algae. In polluted water, amount of these inorganic substances increases due to which algae increases greatly at the surface of water or pond. Extensive increase of these algae is called water bloom. Due to death of these algae their organic matter gets decomposed. This leads to oxygen depletion due to which aquatic animals die. If these activities persist for long time, the pond has more organic matter and less water. This process is called eutrophication.

356 **(b)**

A-*Volvox*, B-*Chlamydomonas*, C-*Chara*

357 **(a)**

In ferns, the embryo is a diploid structure as it is formed by the fusion of gametes, while the spores are haploid structures formed by meiosis in diploid spore mother cell. Thus, if number of chromosome in embryo is 8 (2n), then the number of chromosomes in spores shall be 4(n).

358 **(d)**

Gelidium, Graccilaria and *Pterocladia* are red algae having industrial importance. They produce a jelly like substance agar-agar which used as culture medium with a number of different uses.

359 **(a)**

Chlorella, a green alga is used as food because it is rich in **proteins** (50%), **carbohydrates** (20%), **fats** (20%), **vitamins** and **minerals** (10%). It provides an antibiotic **chlorellin**.

360 **(d)**

An ideal embryo sac contains 7-cells and 8-nuclei. Embryo sac consists one egg cell, two synergids, three antipodal cells and two polar nuclei in a central cell

361 **(c)**

Female reproductive organ of bryophytes is archegonium. Oogonium is a female reproductive organ of some algae and fungi. Sporangium is a sac like structure, which produces asexual spores in cryptogams and phanerogams.

362 **(b)**

70 species of marine algae like *Porphyra, Laminaria* and *Sargassum* are used as food

363 **(a)**

Chlamydomonas nivalis grows in polar regions imparting red colour to snow, hence the name red snow.

364 **(b)**

The thallus of *Volvox* is hollow ball like flagellate colony. It is called as **coenobium.**

365 **(a)**

The peristome of moss consists of two sets of long conical teeth. There are 16 teeth in each set, the total being 32.

Land plants all have heteromorphic alternation of generations, in which the sporophyte and gametophyte are distinctly different

367 **(c)**

Ginkgo a gymnosperm is also known by alternative name called 'maiden hair tree'.

368 **(d)**

Girdle-shaped chloroplast is present is Ulothrix.

369 **(c)**

A – Dictyota B – Polysiphonia

C – Porphyra D – Laminaria

E – Fucus

370 **(b)**

Chlorophyll-*a*, xanthophylls and carotenoids. Gk; *Phaios* = brown, *Phyton* = plants Phaeophyceae cell contains more than one parietal chromatophores. The chromatophores contain chlorophyll-*a* and c β -and α -carotenes and xanthophylls. Besides, they contain large amount of brown coloured xanthophyll-fucoxanthin, which masks the green colour of chlorophylls and that is why these algae appear brown in colour

371 **(d)**

In the prothallus of a vascular cryptogam, the antherozoids and eggs mature at different times. As a result, self-fertilization is prevented.

372 (d)

In flowering plants, a cross section of the developing anther displays four chambers. These chambers are called pollen sacs. Each pollen sac is filled with cells containing large nuclei. As the anther grows each of these cells goes through two meiotic divisions, forming a tetrad. These cells are called microspores. Each one of these microspores eventually becomes a pollen grain and in carpel meiosis takes place at the time of megaspore from megaspore mother cell

373 **(c)**

Spirulina (blue-green algae) is highly rich in proteins, vitamin-B complex and minerals. Powdered Spirulina is being used in herbal tonics and biscuits, Chlorella (50-55% protein content) and Porphyra (25-30% proteins) are also used as a source of proteins.

374 **(a)**

Rhodophyceae - floridean starch

Phaeophyceae - laminarian, mannitol

Chlorophyceae - starch

375 **(c)**

Chlamydomonas shows isogamy and anisogamy types of sexual reproduction

376 **(d)**

Mosses are green, leafy upright and radial in symmetry. They are highly developed of all the bryophytes

377 **(a)**

Cyanobacteria or blue-green algae are autotrophic organisms, which belong to the class-

Cyanophyceae. These possess chromatophores instead of chloroplasts (membrane bound structures containing photosynthetic pigments and the site of photosynthesis).

378 **(d)**

The leaves in case of gymnosperms are well adapted to with stand extremes of temperature, humidity and wind. These shapes are xeromorphic adaptations because they reduce the amount of surface area available for evaporation. They have many other xeromorphic adaptation, which include a thick cuticle, sclerified epidermal cells, sunken stomata, a sclerotic hypodermis, tightly packed mesophyll, an endodermis, few or no lateral veins and centrally located vascular tissue

379 **(a)**

Cycas reproduces vegetatively by forming **bulbils** or adventitious buds, which differentiated on the main stem. The base of bulbil is swollen and covered by the scale leaves, at its tip a few foliage leaves arise, after detachment they give rise to a new plant.

380 **(b)**

Cytotaxonomy is based on cytological studies of the cell including the size, structure and number of chromosomes as well as behavior of chromosomes during meiosis for classification purposes

381 **(d)**

All the statements are correct *The life cycle of bryophytes consists of two distinct phases* (i) The gametophytic phases

(ii) The sporophytic phase

The haploid gametophyte is dominant, long lived, green and independent, whereas the diploid sporophyte is short lived and dependent upon the gametophyte some cells of the sporophyte under go meiosis to produce haploid spores. These spores germinate the produce gametophyte

382 **(a)**

In mosses vegetative reproduction occurs through fragmentation or through bud in secondary protonema

383 **(c)**

Polygonum type of embryo sac is the most common in angiosperms. It is 7-celled and 8nucleate. The nuclei are arranged in such a way that three organised at micropylar end and form egg apparatus (one egg and two synergides,) two nuclei migrate to centre and form polar nuclei in a single central cell and three nuclei at chalazal pole organised into antipodal cells

384 **(a)**

The given features are of *Cycas*.

385 **(b)**

Heterospory is the production of spores of two different sizes and of two different developmental patterns. Heterospory is an expression of sex determining spores of the plant. It is the most important evolutionary development in the vascular plants because it has ultimately lead of seed development, *e. g., Selaginella, Salvinia, Azolla*, etc.

386 **(b)**

Carolus Linnaeus a Swedish botanist, who published an artificial system of classification based exclusively on floral characters

387 **(c)**

Fragmentation.

Algae reproduce by vegetative, asexual and sexual methods. The vegetative and asexual methods are abundant. Algae reproduce vegetatively by fragmentation and asexually by means of motile or non-motile spores. Sexual reproduction occurs through fusion of two gametes

388 **(d)**

True roots, stem and leaves having vascular supply absent but root like, non-vascular rhizoids, leaf like and stem like structures are present

389 **(d)**

Blue-green algae show prokaryotic cell organization, which is characterized by the presence of DNA without histones (but some basic proteins present) 70 S ribosomes, absence of nuclear membrane and membrane bound organelles. Many species like *Nostoc, Anabaena* contain heterocyst, which is specialized for nitrogen fixation.

390 **(b)**

S R Kashyap is known as **father of Indian Bryology** for his contribution.

391 **(c)**

The chloroplast of *Anthoceros* contains 'pyrenoid', made up of 25-30 discoid or spindle-shaped bodies.

392 **(d)**

Cycas resembles with angiosperm, due to presence of siphonogamy, *i. e.*, male gametes are carried to the female gametes through pollen tube.

393 **(a)**

Megasporophyll is the term used in gymnosperm to denote carpel (female reproductive organ). The megasporophylls are loosely arranged in *Cycas*. They do not form a true female cone. Female reproductive structure is a rosette of megasporophylls arising spirally in acropetal succession on the stem apex of female plant. In *Pinus* each megasporophyll consists of a lower bract scale and a larger upper ovuliferous scale

394 (a)

Haplo-diplontic life cycle is followed by bryophytes and pteridophytes. In this case sporophytic as well as gametophytic phases is multicellular

395 **(d)**

Green alga contains chlorophyll -a and b as well as small amount of carotenoid pigments are located in the grana of chloroplast, as it occurs in the land plants. Reserve food material is stored in the form of starch.

396 **(b)**

In the ectophloic siphonostele, the xylem surrounds pith and this xylem is surrounded by phloem, pericycle and endoderm respectively, *e.g.*, *Osmunda* and *Equisetum*.

397 **(a)**

A- Mycorrhiza, B- Pinus.

Mycocorrhizal associations are mutualistic association between higher fungi and gymnosperms (*Pinus*) or angiosperms in the plant

398 **(a)**

Sphagnum is a bryophyte, commonly called as bogmass or peat moss. It is hygroscopic and possesses a rem arkable water holding capacity. Hence, it is used as a packing material in the transportation of flowers, live plants, tubers, bulbs, seedlings, etc. It is also used in seed-beds and in moss-sticks

399 **(d)**

Bryophyte is a group of embryo producing plants, which do not bear fruits, seeds and any vascular tissue. They are known as 'amphibians of plant kingdom'. Body is thalloid and green (due to presence of chloroplast). Male sexual organ is antheridium and female sexual organ is archegonium.

400 **(a)**

In *Spirogyra*, lateral conjugation occurs in homothallic filament.

401 **(b)**

The protonema is a stage in the life cycle of *Funaria*. Protonema is the juvenile stage of moss. It results from the germinating meiospore

402 **(d)**

Dinoflagellates like *Noctiluca, Gonyaulax, Pyrocystis* show bioluminescence.

403 **(b)**

The haploid gametophyte is dominant, long lived, green and independent whereas the diploid sporophyte is short lived and dependent upon the gametophyte

404 **(d)**

Flagellated male gametes are present in *Riccia*, *Dryopteris* and *Cycas*.

405 **(b)**

Brown algae are vary in colour from olive green to various shades of brown depending upon the amount of the xanthophyll pigment, fucoxanthin present in them

406 **(b)**

Nostoc is a blue-green alga or cyanobacterium. It 414 (b) is filamentous and in most cases colonial bluegreen alga. It occurs in free state as well as in symbiotic association with Anthoceros (a bryophyte) or with Gunnera manicata (an angiospermic marsh plant).

407 (c)

The members of class-Chlorophyceae usually have a two layered rigid cell wall made up of cellulose and pectose. Inner layer of cell wall is made up of cellulose, while outer layer is made up of pectose

408 (a)

Zygotic meiosis takes place in algae (*Chlamydomonas*, *Oedogonium*, *Spirogyra*, etc) and fungi (*Rhizopus*, *Mucor*, etc.)

409 **(b)**

Fertilization in *Cycas* is siphonogamous followed by zooidogamous. During fertilization the pollen tube discharging its contents into the liquid of archegonial chamber. The cilia and membrane of sperm slips off and cytoplasm and nucleus fuses with the egg forming oospore.

410 (a)

The zygote of *Pinus* immediately germinates. It undergoes a series of mitotic divisions, still enclosed within the ovule to form a relatively elaborated 16 celled proembryo. The four lowermost cells farthest from the micropylar end constitute the **embryonal tier**, **suspensor tier** the third tier from below is called the **rosette tier**.

411 (b)

The kingdom-Plantae includes algae, bryophytes pteridophytes, gymnosperms and flowering plants (angiosperms). They are common on land, on sea shore and in freshwater

412 **(b)**

Haploid spore is the first cell of gametophytic generation. The spores of moss germinate to form protonema. The cells of protonema contain chloroplasts.

413 (a)

Pteridophytes mostly occur in cool, damp and shady places. Pteridophytes are fundamentally terrestrial plants but they are dependent on an external source of water for completion of their life

Protonema is a branched, multicellular, filamentous or (less commonly) thalloid structure, produced on germination of a bryophyte spore, from which new plant develops as buds.

It forms the juvenile filamentous stage in the life cycle of Funaria.

415 (a)

Some bryophytes also work as soil binders, when they grow in aggregations

416 **(b)**

Heterospory is the production of spores of two different sizes and of two different developmental patterns. Heterospory is an expression of sex determining spores of the plant. It is the most important evolutionary development in the vascular plants because it has ultimately lead to seed development,

e.g., Selaginella, Salvinia, Azolla, etc.

417 (a)

In moss capsule, shock absorbers are trabeculae.

418 **(b)**

Protonema is slender, green, branched and filamentous gametophytic phase in the life cycle of Funaria.

419 (c)

The plant life cycle has both a sporophyte and a gametophyte generation. The stage of a plant life cycle, that produces spores by meiosis and alternate with the gametophyte stage is called sporophytic stage

420 **(b)**

Hutchinson system of classification

421 (d)

Transfusion tissue is present in the leaves of *Cycas* and *Pinus*, made up of horizontally arranged tracheidal cells and is meant for lateral conduction of water and minerals to mesophyll tissue upto margins.

422 (d)

The life cycle of bryophytes consists of two *distinct phases*

(i) The gametophytic phase

(ii) The sporophytic phase

The haploid gametophyte is dominant, long lived green and independent, whereas the diploid sporophyte is short lived and dependent upon the gametophyte

423 **(c)**

Pyrenoids are proteinaceous bodies present in chromatophores. These are considered to be associated with synthesis and storage of starch. In members of Chlorophyceae pyrenoids are surrounded by starch plates.

424 **(b)**

Antherozoids of ferns and mosses are stimulated by special chemicals, this movement is known as **chemotaxis**.

425 **(b)**

Algae plays an important role in carbon dioxide fixation on earth through photosynthesis and increase the level of O_2

426 **(c)**

Asexual reproduction is by flagellated zoospores produced in zoosporangia. The sexual reproduction shows considerable variation in the type and formation of sex cells and it may be isogamous, anisogamous or oogamous. In isogamy, gametes are morphologically and physiologically different but physiologically same and in oogamy, gametes are both morphologically and physiologically different, *e. g., Ulothrix* and *Spirogyra* members of Chlorophyceae

427 **(b)**

In class-Phaeophyceae the accumulation product of photosynthesis is D-mannitol or laminarin

428 **(b)**

Apophysis is the apical sterile portion of the microsporophyll in *Cycas*.

Apospory is the formation of gametophyte directly from sporophyte.

Apogamy is the formation of sporophyte directly from gametophyte.

429 **(a)**

The first division, which comes under kingdom-Plantae is algae

430 **(d)**

Microsporangia are produced at the extreme tip of microsporophyll. Microsporangia is a sporangium that produces spores that give rise to male gametophyte

431 **(a)**

The filamentous stage produced from the developing spores of the mosses is called **protonema.** It gives rise to the gametophore.

432 **(c)**

Fusion of morphologically dissimilar gametes, which may be motile or non-motile. The female gamete is usually larger and non-motile and male gamete is smaller. They fusion of large and small gametes is called anisogamy

e.g., Chlamydomonas

433 **(b)**

Heterosporous pteridophytees like Selaginella and Marsilea always produce **dioecious gametophyte** because microspore will form male gametophyte and megaspore will form female gametophyte.

434 **(b)**

Spirulina (a blue-green alga) is a rich source of protein, many vitamins especially B-complex and minerals. It has a promising supplementary value to the common Indian cereals such as rice, wheat and ragi. Hence, doctors are advised the patients to take *Spirulina* in their diet for recovery.

435 **(c)**

A ring of multiciliate zoogonidium is found in the algae *Oedogonium*.

436 **(a)**

Sterile part of *Cycas* microsporophyll is **apophysis**.

437 **(d)**

When a group of plants is represented by a single genus or species, while rest of the other representatives of the group have become extinct and fossilized, the long surviving individual is called a living fossil, *eg*, *Ginkgo biloba*. However, *Cycas* is also regarded as a living fossil because most of the cycad species are confined to tropical and subtropical regions and the group is becoming endangered.

438 **(d)**

Pollen grain is released from microsporangium and carried with the help of air current. It comes in contact with opening of ovules. Male gamete fuses with egg to give rise zygote. Zygote develops into embryo and embryo into seeds. In angiosperm archegonium is absent

439 **(b)**

Funaria is a pleurocarpous moss, *i. e.*, have male reproductive structures on main axis and female reproductive structures on lateral branches.

440 **(d)**

In the members of Phaeophyceae or brown algae, food is stored as complex carbohydrate, which may be in the form of laminarian or D-mannitol.

The members of Rhodophyceae are commonly called red algae because of the predominance of the red pigment, r —phycoerythrin in their body.

441 **(a)**

Like plants, algae have cell walls which contain either polysaccharides such as cellulose (glucan) or a variety of glycoproteins or both. The inclusion of additional polysaccharides in algal cell walls is used as a feature for algal taxonomy. Mannans form microfibrils in the cell walls of a number of marine green algae including those from the genera *Codium, Acetabularia* as well as in the walls of some red algae like *Porphyra*.

442 **(a)**

Chloroplast.

Green algae store food in form of starch in specialised structures called pyrenoids located in chloroplast. Each pyrenoid has a central protein called 'pyrenocrystal' and a surrounding starch sheath

443 **(b)**

Indusium is found in ferns.

445 **(a)**

The predominant stage of the life cycle of a moss is the gametophyte, which consists of two stages. The first stage is protonema stage, which develops directly from a spore.

The second stage is the leafy stage which develops from the secondary protonema as a lateral bud. They consist of upright slender axe bearing spirally arranged leaves. They are attached to the soil through multicellular and branched rhizoids. This stage bears the sex organs

446 **(b)**

In both gymnosperms and angiosperms, the megaspore mother cell undergoes meiosis and produces four haploid megaspore. Out of four megaspore three will degenerate. Therefore, for formation of 64 zygotes in gymnosperm and angiosperm 64 meiosis in megaspore mother cell will required. Whereas the microspore mother cell in both gymnosperm and angiosperm undergoes meiosis and produced four haploid microspore. All the four will be functional therefore, for formation of 64 zygotes, 16 meiotic division in microspore mother cell will be required.

447 **(a)**

In gymnosperm, microspores develop into a male gametophytic generation, which is highly reduced and is confined to only a limited number of cell. This reduced gametophyte is called a pollen grain. Its development takes place in microsporangia

448 **(c)**

A monoecious plant has both male and female reproductive organs on the same individual (plant) while dioecious plants are unisexual, having male and female reproductive organs on different individuals (plants).

449 **(b)**

Volvox, Spirogyra and *Chlamydomonas*are all green algae belonging to class-Chlorophyceae.

450 **(b)**

Megaspores are haploid

451 **(c)**

In the stem of *Cycas*, the stele is eustele type, which consists of a ring of discrete vascular bundles. In these bundles, the primary cambium lies between the phloem and xylem.

452 **(b)**

Heterotrichous habit having prostrate and erect system by a filamentous thallus is must for evolution of terrestrial plants. It is found in green algae like *Fritschiella*, other examples are *Draparnaldiopsis* and *Stigeocolonium*.

453 **(b)**

In bryophytes, the haploid gametophyte is dominant, long lived, green and independent whereas the diploid sporophyte is short lived and dependent upon the gametophyte. Water is essential for reproduction. The sex organs are multicellular and jacketed with sterile jacket

454 **(d)**

The gaint *Sequoia* is the world's most massive tree and arguable the largest living organism on earth

455 **(b)**

Fusion of morphologically dissimilar gametes, which may be motile or non-motile

456 **(d)**

The plant body of some highly advanced forms (*e.g.*, Fucales, Laminariales) is differentiated into basal more or less root-like hold fast, erect branched or unbranched, tubular or compressed stipe and leaf-like blades the frond

457 **(b)**

In *Ulothrix*, the cells in the filament commonly produce and discharge the zoospores about the same time just after sunrise.

458 **(d)**

Indusium is a protective kidney-shaped covering of sorus present in *Dryopteris*.

459 **(a)**

Pollen grains in *Pinus* are **monosaccate**. In *Pinus*, pollen grain is unicellular, three layered: outer exine, the middle exo-intine and innermost intine.

460 (a)

The characteristic feature of fern's leaves is circinate venation in which coiled arrangement of leaves and leaflets is found in the bud.

461 **(b)**

Protonema is the juvenile stage of moss resulting from the germinating meiospore and consists of a slender, green, branching system of filaments. In *Funaria*, the protonema stage is only vegetative and transitory, which precedes the upright, leafy gametophyte.

462 **(c)**

Gamete is the haploid reproductive cell that fuses with another gamete to form a diploid zygote. These are not surrounded by the cell wall. On the other hand, root hair cell stem hair cell and bacterial cell, all possess a well defined cell wall.

463 **(b)**

Cycads possess top-shaped, multiciliate male gametes and he mature seed, which bears only one embryo with two cotyledons.

The **pteridophytes** exhibit alternation of dominant sporophytic generation with an inconspicuous gametophytic generation. The sporophyte is differentiated into root, stem and leaves, while the small and inconspicuous gametophyte is independent and autotrophic.

465 **(b)**

Pteridophytes are vascular cryptogams. They generally produce spores but do not produce seeds.

Bryophytes are non-vascular but spore forming cryptogams.

Gymnosperms and **angiosperms** are vascular and seed forming phanerogams. All seed forming plants are also known as **spermatophytes**.

466 **(c)**

c – phycocyanin pigment is found in blue-green
 algae (cyanobacteria).

467 **(c)**

Unicellular smooth and tuberculated rhizoids are present in the region of midrib at ventral surface of *Riccia*.

468 **(c)**

Fucus, a brown alga displays a diploid life history. The zygote (2n) becomes an embryo and develops into the mature *Fucus* with receptacles at the tip of the algae.

469 **(b)**

Gymnosperms are naked seeded plants because seeds are presents on the megasporophyll and are not enclosed with fruit wall due to lack of ovary wall

470 **(b)**

Pinus, is a gymnospermic plant that does not have *Rhizobium* containing root nodules.

471 (d)

A- Stigma, B-Anther, C-Male gametophyte, D-Egg, E-Ovule

472 **(d)**

In gymnosperms the plants are diploid and well adapted to extreme conditions, *e. g.*, the leaves in case of gymnosperms are well adopted to withstand extremes of temperature, humidity and wind. These shapes are xeromorphic adaptations

because they reduce the amount of surface area available for evaporation. They grow bearing sporophylls incompact structures called cones

473 **(c)**

After fertilisation ovules develop into seeds and ovaries develop into fruit

474 **(d)**

Most algal genera are haplontic, some of them such as *Ectocarpus, Polysiphonia, Kelps* are haplodiplontic. *Fucus*, on alga is diplontic

475 **(a)**

Azolla is an aquatic fen with bilobed leaves. It encloses large mucilage cavity, which contain filaments of *Anabaena azollae*. *Anabaena* fixes nitrogen from air into nitrogenous compounds, which accumulate in the air spaces in leaves and in return takes food material and shelter from plant.

476 **(c)**

Nostoc is an alga. It contains chlorophyll and can prepare its own food, *i. e.*, autotrophic.

477 **(c)**

In some pteridophytes sporophylls may form distinct compact structure called cone or strobili. *e. g., Selaginella, Equisetum*

478 **(b)**

Brown algae show great variation in size and form. They range from simple branched, filamentous forms (*Ectocarpus*) to profusely branched forms as represented by kelps, which may reach a height of 100 metres. The giant brown algae are called kelps. The largest kelps are *Nereocystis* (20-30 m) and *Macrocystis* (40-60

m) 479 **(b)**

In Chlamydomonas, the meiosis occurs in zygote.

480 **(c)**

Sphagnum

481 **(c)**

Pteridophytes are spore forming, non-seed bearing, non-flowering vascular plants.

Thallophytes do not have vascular tissues.

Bryophytes also come under thallophytes.

Spermatophyte is a group of seed forming vascular plants. It includes gymnosperms and angiosperms.

482 **(d)**

The female cone of *Pinus* is formed by the aggregation of megasporophylls, which bear ovules. Each megasporophyll consists of a lower bract scale and a larger upper ovuliferous scale.

483 **(d)**

Algae include unicellular forms like *Chlamydomonas*, filamentous like *Ulothrix* and colonial forms like *Volvox*

484 **(d)**

Protonema is the juvenile stage of moss. It results from the germinating meiospore. When fully grown, it consists of a slender green, branching system of filaments called the protonema

486 **(d)**

Volvox is a freshwater green alga. It occurs in **colonies** or coenobium (in definite number or group), surrounded by a pellicle (gelatinous glycoprotein) layer. Each pyriform shaped cell has two long similar and **smooth flagella**, eye spot, cup-shaped chloroplast with pyrenoids and contractile vacuoles.

487 **(c)**

Hydropterids are only plant among the heterosporous. Pteridophytes that are leptosporangiate. Leptosporangiate in which the sporangium origin from epidermal cell Heterosporous pteridophytes were the first land flora of earth. The difference in size between microspore and megaspore is 1:2000 female gametophyte of *Selaginella* mostly have single archegonium

488 **(a)**

Male sex organ is stamen also known as androecium. It consists of an anther lobe and a filament. Anther produces pollen grains

489 **(d)**

Cephaleuros is a green parasitic alga, which causes red rust of tea and coffee.

490 **(c)**

Fucus belongs to class-Phaeophyceae, in which reserve food is found in form of laminarian, mannitol and oil.

492	Sporophyll \rightarrow Strobili \rightarrow Sporangia \rightarrow Spore mother Cell \rightarrow Spores (c)		form trabeculae connecting the two tissues. The stele remains suspended by this unicelled (rarely multicelled) trabeculae.
	and ovary wall forms the fruit wall (pericarp). But gymnosperms have naked seeds because in gymnosperms, ovary (pericarp) is absent.	499	(a) The akinetes and aplanospores are asexual bodies in <i>Spirogyra</i> . These are haploid structures. The zygospore is formed during sexual reproduction
493	(a) In ammensalism, one component (species) is harmed and the other remains unaffected. The alga <i>Microcysis</i> release hydroxyl amine that kills		by fusion of two protoplasts. Prior to germination, the diploid zygospore nucleus undergoes meiosis.
	the surrounding fauna but the alga itself remain unaffected.	500	(a) The archegonial venter forms a protective covering around the embryo called calyptra .
494	(d) Bryophytes resemble algae in many ways, some of which are	501	(a) <i>Ectocarpus, Dictyota, Laminaria, Sargassum</i> and <i>Fucus</i> , all are the examples of class-Phaeophyceae
	(i) thalloid plant body	502	(b)
	(ii) absence of roots		In <i>Spirogyra</i> , the sexual reproduction involves the fusion of two morphologically identical
	(iii) absence of complex vascular tissues		isogametes, and physiologically dissimilar
	(iv) autotrophic mode of nutrition		the active gamete is known as the male and the
	(v) reserve food material is true starch.		passive as the female.
495	(d)	503	(b) Boyhoumia anhullais a classical example of
	Algae are chlorophyll-bearing, simple thalloid,		saprophytic bryophyte
	autotrophic and largely aquatic organisms. They occur in a variety of other habitats: moist stones.	504	(b)
	soil and wood. Some of them also occur in	506	A-Fucus, B-Polysipnonia, C-Porphyra, D-Dictyota (d)
	association with fungi (lichen) and animals (<i>e.g.</i> ,		The diploid bispiral elaters are hygroscopic. They
496	(a)		help in the dispersal of spores in Marchantia.
	The bryophytes are divided into liverworts and	507	(d) Descridenbytes are called vaccular crimtogame also
497	(a)		known as seedless vascular plants. They produce
	In red algae vegetative reproduction takes place		spores rather than seeds
	by fragmentation. The reserve food material is in the form of floridean starch. It is very much	508	(a) Fern gametonhyte is homothallic. It hears male
	similar to amylopectin and glycogen in structure.		gamete (antherozoid) and the female gemete
	compounds and certain mucopolysaccharides	-	
	called phycocolloids	509	(b) An androgynous recentacle is the one which
498 (7 1 1 f	(c) The stem of <i>Selaginella, Kraussiana</i> shows distelic condition. Some air spaces develop between the endodermal cells isolating two steles from the cortex. The endodermal cells elongate to		contains antheridia on upper side and archegonia on lower side, <i>e. g.</i> , <i>Marchantia</i> .
		510	(d) Class-Rhodophyceae.
	from the cortex. The endodermal cells elongate to	•	Class-Rhodophyceae.

In class-Rhodophyceae the photosynthetic pigments located in the chromatophores are chlorophyll-*a*, *d*, α - β -carotene, xanthophylls and biliprotein (*r*-phycoerythrin) (red in colour) and *r*-phycocyanin (blue in colour)

511 (c)

In Dryopteris, the young parts of the leaves and rhizome while in *Cycas*, scaly leaves remain covered with small brown hair called ramenta.

512 (a)

The sperm of *Cycas* is top-shaped with numerous cilia arising from a spiral line running from the pointed end towards the broader end. The sperm of *Cycas* is perhaps the largest of all known male cell in plant and animal kingdom.

513 (d)

IN *Marchantia* a bryophyte, the archegonia 517 (c) (female sex organ) are borne on special branches called archegoniophore or female receptacles. Each archegoniophore has rows of archegonia protected by involucre or perichaetium.

514 (c)

In Pinus, each male cone consists of an elongated axis, bearing a number of spirally arranged microsporophylls. On the underside of which two microsporangia develop and get filled with microspores (pollen grains).

515 (b)

Ginkgo is a gymnospermic plant, so it comes before angiospermic plant, Pisum (pea).

516 (b)

Pteridophytes are spore forming non-seed bearing, non-flowering vascular plants. An anthimintic drug is obtained from the rhizomes and petioles of the fern.

Dryopteris, Lycopodium is used in treatment of rheumatism and disorders of lungs and kidneys. They are used as soil binders. Presence of heterospory (morphologicacally two levels of spores) is a characteristic features of pteridophytes

Corolloid root is developed in *Cycas*. It contain an algae zone in the cortex. This algal zone contains blue-green algae (cyanobacteria) like Nostoc, Anabaena, which grow in symbiotic association with corolloid root

518 (c)

Leaf in young condition in fern is called circinate ptyxis (*i.e.*, coiled like a spring).